104

THE EFFECTS OF A SIX-YEAR BALANCED BUDGET ON CIVILIAN RESEARCH AND DEVELOPMENT—PARTS I AND II

Y 4. SCI 2: 104/74

The Effects of a Six-Year Balanced...

HEARINGS

BEFORE THE

COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

SECOND SESSION

JULY 23 and 24, 1996

[No. 74]

Printed for the use of the Committee on Science

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THE EFFECTS OF A SIX-YEAR BALANCED BUDGET ON CIVILIAN RESEARCH AND DEVELOPMENT—PART I

TUESDAY, JULY 23, 1996

U.S. House of Representatives,
Committee on Science,
Washington, DC.

The Committee met at 10:03 a.m. in room 2318 of the Rayburn House Office Building, the Honorable Robert S. Walker, Chairman of the Committee, presiding.

The Chairman. The hearing of the full Science Committee will come to order. The Chair would ask unanimous consent that the written testimony of the witnesses be submitted in full for the record.

[No response.]

The Chairman. Hearing no objection, so ordered.

This is the first day of two days of hearings that this Committee is going to be holding on the issue of the budget and how that budget will affect civilian research.

I realize that there are some people who have looked upon this hearing as possibly being pejorative in nature. That is not the intention of this Chairman, and I hope that the kind of testimony and questioning that we have will reflect the seriousness with which I am attempting to deal with this subject.

The problem is this, that we have decided, as almost a ubiquitous kind of thing, that the budgets are going to be balanced between now and the year 2002.

The question then becomes, what is going to be the impact on civilian research?

We went through a fairly lengthy political debate last year when we had put our seven-year plan on the table, which included some outyear downsizing of science programs. What we said at that time was that those outyear downsizings were based upon, then, prioritization, which allowed some budgets to grow while others were being reduced or totally eliminated.

We were roundly criticized during that time for reducing science spending. The Administration then put forward its seven-year balanced budget, and, low-and-behold, they also had the same kinds of problems; that in the outyears, civilian research ended up being reduced as other things in the budget had to be, in order to meet the reduced amount of money for discretionary budgets in those outyears.

Now, what I hope this hearing will be all about is not just the relative differences between our plan and the Administration's plan, but the real nature of what we face in terms of these outyears.

I mean, are the projections into the outyears serious projections?

We, at least, have treated them as though they are, that you have to have a real plan that looks forward in order to be at all confident of that which you are doing.

My concern in all of this has been that there have at least been some statements on the public record from officials within the Administration that suggest that if you looked beyond one year, it does not make any sense, and that the outyear projections are rather meaningless kinds of exercises.

I understand that they are very difficult figures to calculate, and very difficult figures to quantify. On the other hand, they are also an important part of doing the planning necessary in order to reflect all of this reality.

That is what we are going to try to look at here, is what goes on. I am pleased that the AAAS, who has done some studying of this, looking at the present figures and the outyears, is with us today to present some testimony.

Mr. James Blum from the Congressional Budget Office is with us. We have invited, almost ad nauseam, the OMB to be with us, and have been told constantly that they will not appear.

I will continue to leave a place open in these hearings today and tomorrow for them if they would be here, because I think their input into this kind of discussion is very important.

Well, with that—those preliminary remarks—I also have some things here I want to say that I will put on the record, and then I will turn it over to Mr. Brown.

Let me go now to the prepared statement that I think some of you have.

In 1995, President Clinton submitted a budget which projected deficits of at least $200 billion into the foreseeable future.

Congress, however, continued to vigorously pursue a balanced budget and developed a comprehensive seven-year balanced budget. The President then proposed a Fiscal 1997 spending request.

In March, the President said he was submitting a budget which achieved balance in the year 2002, as scored by the Congressional Budget Office.

However, in April, the CBO determined that the only way the President's plan can balance is by enactment of contingent budget proposals.

These contingencies include $67 billion in additional, unspecified discretionary cuts, $22 billion in 2001 and $46 billion in year 2002.

On April 17, 1996, in response to questions of the House Budget Committee hearing, CBO Director, June O'Neill, indicated that these supplementary reductions potentially could fall on science programs.

The Administration, though, will not identify where those cuts could fall.

To complicate matters, a number of agency heads have indicated a lack of confidence in the legitimacy of the Presidents' outyear numbers.

Some have publicly stated that they were told by OMB to ignore the levels and not to take any action to meet those outyear numbers.

Today we will examine and compare the Congressional Budget Resolution and the President's plan to see how these proposals will affect science and technology programs in the outyears.

Tomorrow, during Part II of the hearing, we will have a chance to hear from the representatives of NASA, NSF, and the Office of Energy Research within the Department of Energy.

They will discuss how they feel their agencies will fair under the outlined plans, how these figures compare to those detailed in the Fiscal 1997 House Budget Resolution, and how the agencies would be able to absorb additional cuts in the years 2001 and 2002 without harming basic research.

If the President's outyear budget projections are valid, the funding estimates for years 1998 through 2002, must be evaluated to determine the effect on research and development activities.

Therefore—before I am accused of being blind to the flexibility inherent in the budget process, let me assure you that I know that the individual program allocations in the Budget Resolution are non-binding.

However, the Budget Committee produced, and Congress passed a budget with numbers based upon detailed program-by-program decisions.

I believe such hard decisions are a prerequisite for a real balanced budget. The Administration has admitted that such decisions were not made at the time the President's budget was released.

Today I would like to welcome Dr. Albert Teich, Director of Science and Policy Programs of the American Association for the Advancement of Science.

I thank Dr. Teich for rescheduling his appearance before us due to previous postponements.

I am also pleased to welcome James Blum, the Deputy Director of the Congressional Budget Office. We look forward to your testimony.

I do regret, as I said before, that the Acting Director of OMB, Jack Lew, has informed me that he does not intend to testify today, or to send a designee in his place.

However, we will reserve a place for them today and tomorrow, should there be a change of heart.

I would now like to turn to Mr. Brown for any opening statement that he might care to make.

Mr. BROWN. Thank you very much, Mr. Chairman. I am in general concurrence with your description of what has happened during the budget process.

I am not quite as kind-hearted as you. I intend to be quite pejorative with regard to my comments with regard to the budget.

If you wish to identify a chair up there as the OMB chair, and we can point at it frequently, why, I would be glad to join you in that activity.

[Laughter.]

The CHAIRMAN. If the gentleman would yield, my staff suggested that, and I suggested that that might be a little overly pejorative, but maybe we ought to do it, since the gentleman from California is suggesting it. But I think we will go with our witnesses.

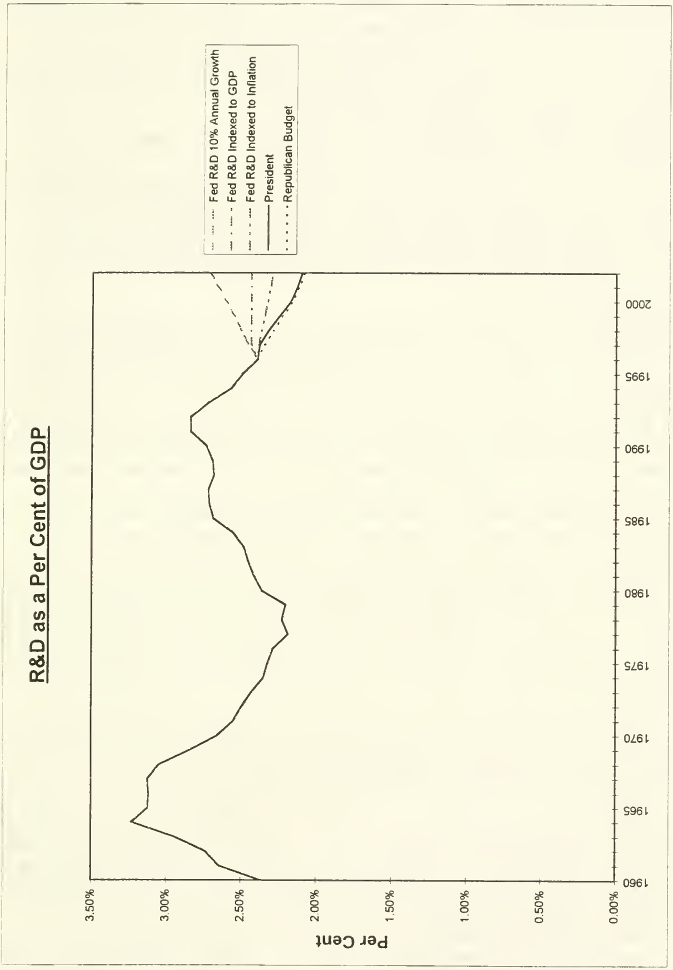
Mr. BROWN. Let me make a few preliminary remarks before going to my prepared statement.

The fact of the matter is, from my standpoint as regards research and development, both the President's budget and the Republican budget, what Mr. Walker calls the Congressional budget, I consider to be equally distasteful in every regard except that they both seem to approach balance.

The level of both of them converge in the year 2000, actually, by OMB scoring, and 2002, by Congressional Budget Office scoring. And neither of them are satisfactory to me.

Over here on this chart is the long-term total national investment in research and development, including both public and private, from 1960 up to the year 2002. The peak, of course, was during the 1960s, and most people forget that.

[The chart referred to follows:]



R&D as a Per Cent of GDP

These are measured in percent of GDP, so they are not actual dollar figures. But in the 1960s, around 1965, we exceeded three percent of the GDP in public and private investment in R&D.

Now, we only have one line on the chart because we have assumed that public and private R&D investment move up and down about the same, and that they each represent about 50 percent. Those are over-assumptions, but——

The CHAIRMAN. Would the gentleman yield? Does that include Defense research as well?

Mr. BROWN. Yes, that does include Defense research. Of course, part of the increase that you see after the precipitous drop in the 70s up to the 80s, is the Reagan Defense buildup which included the R&D buildup, and at that point, again we reached another peak which was not quite at three percent, but it approached it. It was about 2.75 or 2.8.

Now, the current situation is that as of 1997, we have reached an all-time—or almost an all-time low. We are not quite as low yet as we were during the bottom-out of the curve in the 70s, but we are about where we were in 1960, actually at 2.4 percent of the GDP.

And both budgets—and this is why I am pejorative of both budgets—continue that steep decline until the investment in R&D, as a nation, reaches about 2.1 percent of the GDP, and as far as I am concerned, that is totally abysmal.

It is reprehensible. It puts us below every major competitive nation and many nations that are not even competitive with us. We go lower.

The fact of the matter is that the reasons why I do not like either budget is not only the fact that they both show this decline to 2.1 of GDP by the year 2002, but also because of the fact that we have just assumed here that the Defense budget would continue at the levels in the Congressionally adopted Budget Resolution, and that the tax cuts would continue as contained in that, neither of which I accept as realistic.

I think that the President's Defense budget, which in this 1997 Fiscal Year, is about $12 billion less than the Congressional budgets and the tax cuts are substantially lower.

I think in the second Clinton Administration and with the renewed Democratic control of the House and Senate, we are going to see the President's budget numbers adopted, which calls for cuts in both Defense and in tax cuts, and that with those cuts, we are going to be able to re-jigger the R&D cuts and still balance the budget in the year 2000, as the President's original budget did, but it was scored by the OMB.

I would like to have OMB to occupy a spot of prominence and explain why they scored it.

But historically, the OMB estimates of outyear budgets has been more accurate than the CBO's, just as a matter of reality, looking at it year-by-year.

I see no reason why that situation should change, particularly. It mainly involves a matter of educated guesses as to what is going to happen to the economy anyway.

There is no—I hope neither of you gentlemen are economists, but there is no real science to economics, and it is mainly educated guesswork.

Now, I do not belittle the importance of educated guesswork, but I do not like to hang my hat on that seven years down the road and say this is what is going to happen to what I consider to be one of America's most important, fundamental investment programs aimed at securing economic growth and a healthy economy.

That is why I am pejorative of both the Republican budget and the others. Now, having said that, let me at least briefly go into my prepared testimony.

I hope we can address what I feel is the real problem: How can we continue down the path of a balanced budget, and at the same time maintain an adequate level of national investment in areas such as R&D? This should be of real concern to both sides of the aisle.

Unfortunately, it is difficult to take an objective look at this kind of issue amidst the rhetoric that has characterized the budget debate over the past several months.

It reminds me of the debate that we had during the Reagan—the first year of the Reagan Administration when both sides were fighting with each other as to how much of a tax cut they could give, despite the advice of most economists, who I think were right at that time, that such tax cuts would probably cause huge deficits, which it turned out that they did.

Some would have you believe that this is an exercise in budgeting and accounting. I hope we can steer the debate away from the issue of, "What kind of detail does the budget contain six years from now," and focus instead on what level of investment we need to keep pace with our economic competitors, and what kind of science program do we really want for the future?

There should be little doubt that the Administration and Congress seem to be converging on an agreement for reaching a balanced budget.

I strongly prefer the Administration's budget because it provides more money for discretionary spending over these years.

Both budgets, however, will force some extreme choices that neither side has yet fully focused on. The major issue we will face over the next six years is how to balance consumption versus investment.

If one examines the past history of our investment in R&D, as I have already pointed out, we see that in the early 60s, the level of R&D expenditures by the Federal Government and industry was a little over three percent of the GDP.

Most economists believe that this has led to productivity gains in later years. And the productivity gains generally lag the actual investment by a considerable period of time, but most economists feel that they are very real.

From the late 1970s to 1990, our R&D investment climbed steadily from the low point that you see on the chart, and was well on its way to recovering the three percent GDP level.

Since 1990, however, our investment has declined precipitously, mostly dominated by the declining federal level, and at the same time, Japan and Germany have now passed us.

What is the right level of investment? If R&D and economic growth are linked as many believe, the overall investment level should keep pace with the GDP.

This is simply not happening, even though the Clinton Administration has set as a goal, fully recovering this three percent level.

Ever since it announced it as its goal, it is gone further away from it, which I have castigated them for personally, but nobody seems to be listening over there.

There are several scenarios worthy of discussion. First, we can invest enough for R&D to actually make headway with respect to the GDP, and this is what Norm Augustine recommended in his 1990 report with regard to NASA.

He recommended that we grow the NASA budget by about ten percent a year until it reached a level commensurate with that three percent growth rate and then we would level it off.

That shows on there as the top line on the various extensions, and it shows total R&D with a ten percent annual growth rate, by 2002, reaching about 2.7 of GDP.

It does not fully reach the three percent goal, but that is an indication of how difficult it is to reach that goal, and how you should not project such a goal without a plan on how you are ultimately going to reach it.

I have also projected on that chart, a couple of other alternatives. One is a rate of growth which is indexed to the growth in the GDP, and that shows a flat line, actually, from the present time, from the present figure which is about 2.4, and it continues at 2.4.

Then you can index it merely to inflation, which is about half what the GDP growth is, and that shows, again, that you generate a decline in R&D measured as a percent of GDP.

Of course, in both the Republican budget and the President's budget, the bottom line shows a continued decline, both as a percent of GDP and anything else you want to look at.

Now, that is the point that irks me considerably, and I sometimes show how much I am irked. Unfortunately, we are doing—as I say, none of the growth—even—I use growth in terms of just keeping even, basically.

We are not doing that. We are both proceeding, both the Republicans and the President, down the path of continued erosion of our investments, and I think this is tragic.

Various public figures are discussing openly these days, ways to rethink our level of investment.

Former Senator Bill Bradley, has advocated a capital budget which separates out investments from consumption expenditures, and Senator Phil Gramm, to his great credit, advocated just a month ago that we double civilian R&D by 2002.

I think that is a reasonable figure. He is talking, I think, in terms of dollar terms, but that would approach the growth required to come nearly up to the three percent of GDP. These kind of ideas should be debated in any realistic discussion of the budget.

I apologize for the length of my opening statement, Mr. Chairman, and yield back the balance of my time, and ask unanimous consent to revise and extend my remarks.

The CHAIRMAN. Without objection. I appreciate the gentleman's remarks.

I would say to the gentleman that if it becomes apparent in the course of this hearing that the testimony from OMB is going to be necessary in order for us to complete the record on this, we may want to require them to be here. That is something which we will hold in abeyance, and I thank the gentleman for his belief that——

Mr. BROWN. Can we subpoena also the Chairman of the Budget Committee?

The CHAIRMAN. I think he might be willing to come. Without objections, other opening remarks from members will be placed in the record at this point.

The Chair would ask each of our witnesses to limit their remarks, insofar as possible, to five minutes. We will also, without objection, include your entire testimony in the record, but we have a good participation of members here, and we want to be able to get to the questions.

Mr. Blum, we will be happy to start with you.

STATEMENT OF JAMES L. BLUM, DEPUTY DIRECTOR, CONGRESSIONAL BUDGET OFFICE, WASHINGTON, DC

Mr. BLUM. Thank you, Mr. Chairman, Mr. Brown, and members of the Committee.

I appreciate the opportunity to be here this morning to discuss the budgetary outlook for discretionary spending programs, which include, as you have noted, Mr. Chairman, the civilian research activities of interest to this Committee.

My statement is relatively short. I am not sure I will read it all, but let me just point to some of the highlights.

Essentially, at this stage, determining what the future funding levels will be for individual discretionary programs simply is not possible.

However, under both the President's 1997 budget and the 1997 Budget Resolution, the overall amount of discretionary spending through the year 2002 would be substantially lower in real terms than in the current year.

So in that sense, both plans are pointing towards budgetary balance largely by slowing the rate of growth in spending. And for the discretionary programs, that slower rate of growth would be far less than the rate of growth of the economy, and would be less than is needed to keep up with the anticipated increases in inflation and costs of doing business over this time period.

My statement has a very brief description of the President's 1997 budget. The key point here is that under the Congressional Budget Office's more cautious economic assumptions, in order for us to certify, if you will, that the President's budget would reach balance by the year 2002, the contingent policies that the President lays out very clearly in his budget would have to be invoked.

What those contingent policies include would be much lower levels of spending for discretionary programs than, clearly, the President would prefer if the economy were to proceed more along the lines of the Administration's assumptions.

The numbers of the President's budget were updated last week by the Office of Management and Budget in its mid-session review, and essentially the same pattern is there.

Now, the 1997 Budget Resolution, as I indicated—and this is laid out in Table 1 as well as the Figure in my prepared statement—also has declining nominal levels of discretionary spending through the period from 1997 to the year 2002. And of course, relative to the 1996 level of spending adjusted for inflation, these would amount to a considerable slowing of spending for these overall programs.

Now, we cannot really discern exactly what will evolve over this time period because, as the Committee is well aware, the decisions for individual spending programs will be made each year as we go through the annual appropriation process.

So the priorities as they are laid down today, both in the President's budget and in this year's Budget Resolution, could, in fact, change next year or the following year and so forth.

So in that sense, we cannot be definite as to what would happen. But clearly, the outlook is not promising with respect to overall levels of discretionary spending, and therefore, it is entirely possible that the research and development activities so important to this Committee could easily be affected.

In conclusion, what the figure and the table show is that when you get out to the year 2002, even with the President's preferred level of discretionary spending, that is still seven percent below the 1996 spending level adjusted for expected inflation over this time period.

Under the President's contingent policies, which would result in even lower discretionary spending, the level of total outlays for these programs in the year 2002 would be 16 percent lower than the 1996 level in real terms.

The Budget Resolution target is actually a bit lower than that at 18 percent below the 1996 level adjusted for inflation.

Now, unfortunately, I have to deal with these very broad totals because, as I indicated, although the Budget Resolution indicates what a functional distribution is and so forth, I do not have any basis for subdividing it into the finer detail. But it clearly gives you an overview of what the expected outlook is under both the Congressional and the Administration budget plans.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Blum follows:]

CBO TESTIMONY

Statement of
James L. Blum
Deputy Director
Congressional Budget Office

on
The Outlook for Discretionary Spending

before the
Committee on Science
U.S. House of Representatives

July 23, 1996

NOTICE

This statement is not available for public release until it is delivered at 10:00 a.m. (EDT), Tuesday, July 23, 1996.

CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515

Chairman Walker and Members of the Committee, I appreciate the opportunity to discuss the budgetary outlook for discretionary spending programs—such as the research and development activities of interest to this Committee—under both the President's and the Congress's plans for balancing the budget by 2002. At this stage, determining what future funding levels will be for individual discretionary spending programs is not possible. However, under both the President's 1997 budget and the 1997 budget resolution, the overall amount of discretionary spending through 2002 would be substantially lower in real terms than in the current year.

THE PRESIDENT'S 1997 BUDGET

In March, the President submitted his proposals for reaching budgetary balance by 2002. Last week, the Office of Management and Budget (OMB) released its *Mid-Session Review of the 1997 Budget*, updating the numbers in the March budget. The President's budget includes two sets of policies: one that the Administration estimates would balance the budget under its economic and technical estimating assumptions, and a second set that includes contingent policies for reaching balance under the more cautious economic assumptions of the Congressional Budget Office (CBO).

The contingent policies in the President's budget include ending the proposed tax cuts for the middle class and other adjustments after 2000 and lowering spending levels for discretionary programs in 2001 and 2002. According to the OMB midsession review, discretionary outlays would have to be reduced by $24.6 billion in 2001 and by $51.8 billion in 2002 from the President's preferred spending levels in order to achieve budgetary balance under CBO's assumptions. Those reductions and the resulting levels for total discretionary outlays are shown in Table 1 and illustrated graphically in Figure 1.

Neither the March budget nor the July midsession review reveals how the President would allocate the contingent reductions in discretionary spending among individual programs. Although it is not certain, some of those contingent reductions are likely to be applied to federal research and development programs.

THE 1997 CONGRESSIONAL BUDGET RESOLUTION

The Congress adopted its own plan in June for balancing the budget by 2002 under CBO's economic and other estimating assumptions (see Table 1 and Figure 1 for the level of discretionary outlays in the budget resolution). The conference report accompanying the resolution includes a table that allocates the discretionary spending levels by major function, but how the functional totals would be distributed among individual programs is not known.

TABLE 1. TOTAL DISCRETIONARY OUTLAYS UNDER THE PRESIDENT'S BUDGET AND THE BUDGET RESOLUTION (In billions of dollars)

	1997	1998	1999	2000	2001	2002
1996 Appropriations Adjusted for Inflation[a]	550	560	576	594	605	625
Mid-Session Review[b]						
Basic budgetary policies[c]	541	539	536	537	551	579
Contingent proposals[d]	0	0	0	0	-25	-52
Total	541	539	536	537	527	527
Budget Resolution[e]	539	527	525	525	516	514
Mid-Session Review's Basic Policies Minus Budget Resolution	2	12	10	12	35	65
Mid-Session Review's Total Minus Budget Resolution	2	12	10	12	10	13

SOURCES: Congressional Budget Office; Office of Management and Budget.

a. Projections published in Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1997-2006* (May 1996), adjusted for effects of the Omnibus Consolidated Rescissions and Appropriations Act of 1996, which was enacted after the May baseline had been completed.

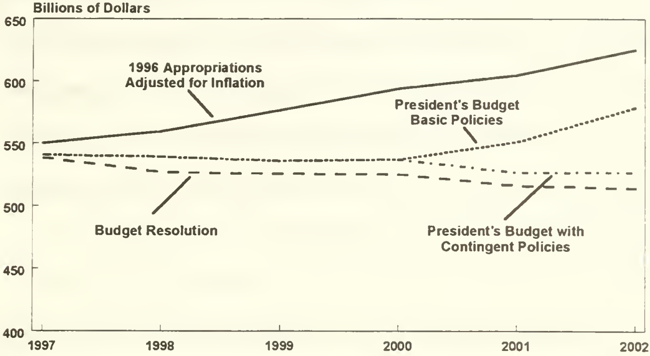
b. Office of Management and Budget, *Mid-Session Review of the 1997 Budget* (July 16, 1996).

c. Policies proposed to be carried out if the Administration's economic and technical assumptions prove accurate.

d. Additional policies proposed to achieve a balanced budget by 2002 under CBO's economic and technical assumptions.

e. Conference report on House Concurrent Resolution 178 (H.Rpt. 104-612).

FIGURE 1. TOTAL DISCRETIONARY OUTLAYS (By fiscal year)



SOURCES: Congressional Budget Office; Office of Management and Budget.

The conference report offers some clues about the priorities of the conferees, such as providing a 3 percent increase for research and related activities of the National Science Foundation, but assumptions behind the budget resolution are not binding on the appropriators. The only binding constraint on the appropriations committees is the total level of discretionary spending for 1997. The appropriation legislation will determine how that level of spending is allocated among individual spending programs.

As Table 1 and Figure 1 show, total discretionary outlays in the 1997 budget resolution are lower in every year than the level proposed by the President, even under the contingent policies that would be needed to reach budgetary balance under CBO's assumptions. Although the difference is quite small for 1997, it represents $10 billion to $13 billion for 1998 through 2002.

CONCLUSION

Under both the President's budget and the Congressional budget resolution, discretionary spending levels in 2001 and 2002 would be lower in real terms than the 1996 spending level. Both Table 1 and Figure 1 show the 1996 spending level adjusted for inflation in 1997 through 2002. In 2002, even the President's preferred spending level for discretionary outlays is 7 percent below the 1996 spending level adjusted for expected inflation. Under the President's contingent policies, discretionary outlays in 2002 would be 16 percent lower than the 1996 level in real terms. The budget resolution target for 2002 is 18 percent lower than 1996 in real terms. Thus, under either plan, the current levels of program activity for discretionary programs could not be maintained in terms of real purchasing power.

How the reductions in real discretionary spending would be allocated to individual programs cannot be known for 1998, let alone for 2001 and 2002. The spending levels for individual discretionary spending programs will be decided each year by the appropriation process, and the current relative spending priorities of both the President and the Congress for discretionary programs will not necessarily be tomorrow's priorities.

The CHAIRMAN. Thank you, Mr. Blum. Dr. Teich, we would be happy to hear from you.

STATEMENT OF DR. ALBERT TEICH, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, WASHINGTON, DC

Dr. TEICH. Thank you. Mr. Chairman, Mr. Brown, and members of the Committee, my name is Al Teich. I am head of the Directorate for Science and Policy Programs at the American Association for the Advancement of Science.

I appreciate this invitation to testify before you today. You have my written statement.

Let me just hit a few highlights.

AAAS has been publishing analyses of R&D in the Federal Budget for over 20 years. I have been personally associated with the budget analysis program for the last 16 of those years.

Most of our efforts each year focus on the proposed budget for the coming year and on Congressional action on that budget.

Last year, however, outyear projections began taking on more significance in policy debates, and we published an analysis of the impact of the Fiscal 1996 Budget Resolution on R&D in the years between Fiscal Year 1995 and 2002.

This year, we have published analyses of the outyear projections in both the President's Fiscal 1997 budget and the Fiscal 1997 Congressional Budget Resolution as well as a comparison of the two.

These analyses have been posted on our web site and are included as an appendix to my formal statement. I have say that in contrast to Mr. Blum, we can do what he says is impossible, which is to allocate the budgets among the various accounts, including R&D, because we do not operate under the same constraints, so we can do the kind of guesswork that CBO does not do.

Let me start off with a few words about the President's Fiscal 1997 budget.

As originally submitted in March, this budget called for an increase of about three percent in non-Defense R&D between Fiscal Year 1996 and 1997. That is three percent after adjusting for inflation.

All of the percentage figures that I give you are adjusted for inflation.

Beginning in Fiscal 1998, however, R&D was projected to decline for several years.

Finally, though, because the President's original budget assumed that the economy would improve after the year 2000, non-Defense R&D would begin to grow again, ending up about 12 percent below Fiscal 1995 by 2002.

However, as you know, the President agreed to give CBO the final word on the economic assumptions, and so the budget sets up a contingency under which certain adjustments would be made in 2001 and 2002, if CBO said that the Budget would not balance by 2002.

As you know, CBO said that that contingency was necessary to apply in its April outlook report. In May, following the CBO announcement, AAAS revised its projections of the President's budget.

Last week, after OMB issued its mid-session review of the 1997 budget, AAAS prepared a further revision, taking account of the new OMB projections and a clarification that OMB provided in the review concerning how to calculate the adjustments.

The details are in my written statement. The bottom line is that, instead of ending up 12 percent down in Fiscal 2002, non-Defense R&D in the President's adjusted budget would be down almost 20 percent.

Now, how does that compare with the Fiscal 1997 Congressional Budget Resolution? The Budget Resolution starts off with a reduction of about four percent in non-Defense R&D between Fiscal 1996 and 1997, and that is compared with an increase in the President's budget.

But by the time you get to 2002, the overall figures for non-Defense R&D are, in fact, fairly close—a decline of 23 percent in the Congressional Budget Resolution, compared with 19 percent in the President's budget.

The color handout that we provided to the members of the Committee, and which is also reproduced in black and white as Chart 1 of my written testimony, displays the comparison.

You can see on the color handout the Congressional Budget Resolution in blue, and in red, the original Administration budget which is the upper branch, and then the lower branch, which is the adjusted version.

As you can see, they are fairly close. You will notice that there is not a zero-base on that chart, by the way.

A couple of things are worth noting about this comparison.

First, because the President's budget starts with an increase in Fiscal 1997 before it begins to decline, total spending on R&D over the entire period is higher under the President's budget than under the Congressional budget.

The other point is that the individual agency budgets look quite different under the two plans, to the extent that we can estimate them.

The details are in my text. In general, NASA and NSF come out ahead in the Congressional plan, while Commerce and Energy come out ahead in the Administration's version.

We can talk about those agency budgets later if you wish, but for now let me just wind up with a caveat about them, and then a few words about our outyear numbers in general.

Quite frankly, I do not have quite the same confidence in our estimates for the agencies in the Administration's adjusted budget as I do in some of our other numbers.

Our analyses of the Congressional numbers, as well as the President's original budget, are backed up by detailed policy statements, but in estimating the President's adjusted budget, we simply took the reductions required to conform to the CBO projections and applied them across-the-board to all discretionary accounts, including R&D.

This was the most reasonable thing to do under the circumstances, but it is probably not how the Administration would choose to do it, and I should be clear about that.

Finally, a caution about outyear projections. These projections serve an important purpose.

They show the policy choices and tradeoffs that are being made to achieve the goal of a balanced budget.

Both the President and Congress would balance the budget primarily through cuts in discretionary spending, including cuts to most accounts funding R&D.

Spending on entitlement programs would continue to increase at a rate greater than inflation.

As actual predictors of the future, however, outyear projections have always been unreliable.

Economic conditions change, national priorities change, the international situation changes, and parties in power change.

If you look back at the outyear projections from budgets of past years, you would not find that they looked very much like today's reality.

Ten years ago, for example, we were debating a Fiscal 1987 budget that projected a surplus by Fiscal 1991. So the only thing I can say with reasonable certainty about the outyear projections in both the Administration's and Congressional Fiscal 1997 budget is that they are not likely to be realized.

Now, despite all of that, these outyear projections for R&D are worth our attention because they tell us about the problems we face and the choices that we have to make to address those problems.

Over the past four decades, except during the Apollo era, trends in R&D have closely followed trends in overall discretionary spending.

Despite our decentralized budget process and the diverse nature of the U.S. R&D enterprise, R&D has consistently averaged around 14 percent of total discretionary spending.

This suggests that the expansion in federal investment in R&D over this period has resulted not just from a commitment to the endless frontier of science and technology, but also from the expansion in discretionary spending which has allowed government investments in a variety of areas, including science and technology, to grow.

That once-growing pie is now shrinking because it is being squeezed between the deficit and growing entitlement programs.

This leads me to my final point.

I speak here as an individual providing my own view. If the Congress and the President continue to pursue a balanced budget primarily through reductions in discretionary spending, that is, without attacking the thorny issues of entitlement reform, then additional cuts to federal support of R&D are inevitable.

Mr. Chairman, that concludes my statement. I will be happy to answer your questions.

[The prepared statement of Dr. Teich follows:]

Testimony of Dr. Albert H. Teich
Director, Science and Policy Programs
American Association for the Advancement of Science
Before the House Science Committee
July 23, 1996

Mr. Chairman, members of the Committee, my name is Al Teich, and I am the head of the Directorate for Science and Policy Programs at the American Association for the Advancement of Science (AAAS). I would like to thank you for inviting me to testify before you today.

Founded in 1848, AAAS is the world's largest federation of scientific and engineering societies, with nearly 300 affiliates. AAAS counts more than 142,000 individual scientists, engineers, science educators, policymakers, and interested citizens among its members, making it the largest general scientific organization in the world. The continuing objectives of AAAS are to further the work of scientists, facilitate cooperation among them, foster scientific freedom and responsibility, improve the effectiveness of science in the promotion of human welfare, advance education in science, and increase the public understanding and appreciation of the importance of the methods of science in human progress. The Directorate for Science and Policy Programs, one of three program directorates, furthers AAAS's objectives in five program areas where the interests of science, government, and society intersect: Science, Technology, and Government; the Center for Science, Technology, and Congress; Science and Human Rights; the Dialogue between Science and Religion; and Scientific Freedom, Responsibility, and Law.

Since 1976, AAAS has published an annual report analyzing research and development (R&D) in the proposed federal budget in order to make available to the scientific and engineering communities and to policymakers timely and objective information about the Administration's plans for the coming fiscal year. I have been associated with the budget analysis effort since

1980, initially as the principal budget analyst and for the past several years as head of the directorate that is responsible for it. The most recent of the program's reports, *AAAS Report XXI: Research and Development FY 1997*, is a collaborative effort involving contributions from approximately 20 scientific, engineering, higher education, and industrial associations known collectively as the Intersociety Working Group. At the end of each congressional session, AAAS also publishes a report reviewing the impact of appropriations decisions on R&D, entitled *Congressional Action on Research and Development in the FY 199x Budget.* The FY 1996 edition was published last May, simultaneously with our report on the President's proposed FY 1997 budget.

As you know, the significance of outyear budget projections has been growing in recent years, as Congress and the President seek, by somewhat different paths, to eliminate the federal deficit and balance the budget. In 1995 AAAS for the first time prepared an analysis of the outyear projections contained in the congressional budget resolution. This became possible because the budget committees laid out their plans and policy assumptions for future years in greater detail than they had generally done in the past.

The AAAS analysis, published in July 1995, indicated that, under the assumptions contained in the FY 1996 resolution, nondefense R&D would be reduced by about one-third by the year 2002, when the effects of anticipated inflation were taken into account. This spring, AAAS prepared similar analyses of the outyear projections contained in the President's FY 1997 budget and the FY 1997 congressional budget resolution. In what follows, I will first describe the methodology that AAAS uses to track R&D generally and then discuss the results of these outyear analyses in more detail.

METHODOLOGY AND DATA SOURCES

In the United States, unlike some nations, there is no overall, separately-identified budget for R&D and no special treatment of R&D in the federal budget. R&D programs are contained within the budgets of various federal agencies, in some cases representing a major share of the agency's budget and activities, in others, a relatively small portion of a much larger set of programs. In most cases, the R&D funds are not line items but are included within general program funding. The Office of Management and Budget (OMB), however, requires agencies whose annual R&D funding is greater than $10 million to submit data on their R&D programs as part of their annual budget submissions. The agencies provide data (reported on OMB Circular A-11, Exhibit 44A, "Research and Development Activities") on funding levels for basic research, applied research, development, R&D facilities, and R&D support to universities and colleges. Although definitions for each category exist (as outlined by the National Science Foundation in *Federal R&D Funding by Budget Function: Fiscal Years 1993-1995*), agencies are not always consistent in their reporting. For example, some agencies classify program direction or management support as R&D while others do not.

Recognizing that they are less than perfect, we use the OMB and NSF definitions of R&D for our analyses and the OMB data as our basic source materials. We supplement the OMB data with information we extract from agencies' congressional budget justification books and often contact OMB and agency budget officials directly to clarify issues that arise. For our analyses of congressional appropriations and budget resolutions, we generally use the text of the relevant bills as well as the reports that accompany them. Because of the complexity and confusion surrounding the FY 1996 budget process, we relied on OMB's final estimates in our wrap-up of the FY 1996 budget.

In our analyses of R&D funding, we have traditionally used the GDP deflators from the President's budget in order to adjust for the effects of inflation on purchasing power. These deflators are updated annually by OMB, and contain both historical deflators and projected deflators for the outyears. Both of our FY 1997 outyear analyses use the projected GDP deflators in the President's FY 1997 budget to allow for side-by-side comparisons. These deflators assume an average of about 2.2 percent inflation for the years FY 1997 through 2002, a significant reduction from last year's estimate of 3.0-3.5 percent.

As Appendix A to this testimony, I have included two excerpts from the wrap-up report, *Congressional Action on R&D in the FY 1996 Budget*. These provide a bit more detail on our methodology and data sources as well as the definitions of R&D that we and the agencies use.

OUTYEAR FUNDING ANALYSIS

In general, neither the President nor Congress included specific details of R&D funding in their outyear projections. In the absence of other information, AAAS extrapolated outyear funding levels for R&D by calculating how much of each account in the current budget represents R&D and then applying that percentage to proposed funding levels for each account in future years. Thus, in our analysis of the congressional budget resolution, we assumed that if 20 percent of a given account is R&D in FY 1996, 20 percent of that account would continue to be R&D in each of the outyears unless specific policy changes (e.g., elimination of an R&D program) were described. In our analysis of the President's budget, we used the specific outyear projections described in the Public Budget Database and assumed that the fraction of each account devoted to R&D would remain constant at the proposed FY 1997 level.

We have not attempted to project how basic research would fare in the outyears. There are no "basic research" programs, *per se*, in the budget. Agencies annually make determinations as to what percentage of a program's R&D should be classified as basic research, applied research, and development. (See the definitions in Appendix A.) While the percentage of a program's budget that is classified as "R&D" usually remains fairly constant over time, the proportions of a program's R&D portfolio that are classified basic research, applied research and development fluctuate depending on changing program missions, changing research priorities, and the differing judgments of the agency officials who report the allocations each year. These fluctuations make any attempt to project basic research in the outyears a far more speculative exercise than projecting total R&D.

The President's Outyear Projections

The President's FY 1997 budget sets out a plan to balance the federal budget by FY 2002. Included in the budget are detailed proposals by budget account for discretionary spending.

AAAS calculated the effects of the President's outyear projections on nondefense R&D during the seven-year period FY 1995-2002. Our initial analysis indicated that total nondefense R&D would increase in the first year of the President's plan, growing 2.9 percent in constant (inflation-adjusted) dollars between FY 1996 and FY 1997. However, between FY 1997 and FY 1998, nondefense R&D would drop by 5.2 percent, then fall another 5.7 percent in FY 1999, and another 4.9 percent in FY 2000. Finally, in FY 2001 and FY 2002, the President's budget assumes that the economy will improve and that discretionary spending, including funding for R&D, will increase, rising faster than the rate of inflation in those two years while still resulting in a balanced budget by the end of the period. By FY 2002, nondefense R&D would recover to 11.7 percent below its original FY 1995 level, after hitting a low-point of 18.9 percent below FY 1995 in FY 2000. (All percentage changes are in constant dollars.)

However, because the President agreed to have his budget plan certified by the Congressional Budget Office (CBO), he included contingency plans that would adjust discretionary spending in the outyears if CBO, in its spring 1996 budget outlook, determined that the budget did not balance by FY 2002. CBO, which used a different set of economic assumptions, announced in late April that the President's plan would lead to a deficit in FY 2002 unless the contingency plans were called into play.

In May, following the CBO announcement, AAAS revised its projections of the President's budget to take into account the contingency plans outlined to ensure CBO certification of the budget. Last week, after OMB issued its *Mid-Session Review of the 1997 Budget*, AAAS prepared a further revision, taking account of the new OMB projections and a clarification the Administration has provided of the adjustments it would make in order to bring the budget into balance under CBO's economic assumptions. This most recent analysis, *Projected Effects of President's FY 1997 Budget Outyear Projections on Nondefense R&D -- Adjusted for July 1996 Mid-Session Review* (Appendix B), shows that instead of turning upward after FY 2000, nondefense R&D would continue to decline slightly. By FY 2002 it would be 19.1 percent below FY 1995, after adjusting for expected inflation.

While every agency would face cuts in R&D programs, the Department of the Interior would be hardest hit, with a 33.4 percent cut in real terms (mainly because of elimination of the Bureau of Mines in the FY 1996 budget). Other agencies would also face reductions in the range of a quarter or more of their R&D budgets by FY 2002: Department of Agriculture, down 27.2 percent; Department of Energy nondefense R&D, down 24.9 percent; National Aeronautics and Space Administration, down 23.7 percent; Department of Transportation, down 23.5 percent. The National Science Foundation's R&D budget is projected to decrease 18.1 percent by FY 2002. The details may be found in the table in Appendix B.

Basis of the AAAS Projections

The original AAAS analysis of the outyears in the President's budget, published on May 16, was based on a literal interpretation of the language contained in the President's budget that would have required a reduction of $40 billion in discretionary outlays in FY 2001 and $81 billion in FY 2002 in order to balance under CBO's economic assumptions. That analysis noted an ambiguity in the Administration's budget documents which left room for an alternative interpretation resulting in somewhat smaller reductions in discretionary outlays. Appendix C explains the ambiguity and describes the rationale behind the AAAS interpretation.

The ambiguity has been resolved by the *Mid-Session Review* which indicates that the Administration would reduce the President's March estimates of discretionary outlays by $20.2 billion in FY 2001 and $45.6 billion in FY 2002.[*] (The difference relative to the earlier AAAS numbers is mainly the result of an explicit indication that the President's proposed tax cut would be allowed to lapse in FY 2001, permitting a smaller reduction in discretionary spending.) The revised AAAS analysis (contained in Appendix B) reduces projected discretionary budget authority by the same amounts in FY 2001 and 2002. In the absence of specific information as to how these reductions should be distributed, the reductions have been applied proportionately to all defense and nondefense discretionary accounts.

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[*] Actually, the *Mid-Session Review* projects making modest additions to discretionary spending in FY 2001 and 2002 ($4.4 billion and $5.6 billion, respectively), facillitated by OMB's projections of stronger economic growth in the future. These additional sums would be eliminated in meeting CBO's projections, but since they were not included in the March budget they are not relevant to the AAAS analysis.

FY 1997 Congressional Budget Resolution

In the budget resolution approved by Congress earlier this month, total nondefense R&D is projected to decline 23.0 percent between FY 1995 and FY 2002, in inflation-adjusted terms. R&D at the Department of Transportation would be the hardest hit, declining 54.4 percent by FY 2002 in real terms. R&D programs at the Department of Commerce would also take significant reductions, decreasing 46.3 percent, as would R&D at: the Department of Energy (nondefense), down 44 percent; the Environmental Protection Agency, down 31.9 percent; and the Department of the Interior, down 29 percent. A detailed table of the congressional budget resolution's outyear projections is attached as Appendix D. It should be noted that we have not provided comparable projections on defense R&D because the budget resolution does not contain detailed assumptions on projected defense expenditures.

Comparing the President's Plan and the Congressional Budget Resolution

In comparing the outyear projections in the President's budget (after adjustments based on OMB's July *Mid-Session Review* that would bring the budget into balance according to CBO assumptions) with those in the congressional budget resolution, it is immediately apparent that they both arrive at about the same point by fiscal year 2002. This is perhaps less surprising than it may seem since the two plans actually have more in common than one might expect. Not only do they share the same set of economic assumptions (those of CBO), but they both place the heaviest burden of deficit reduction on discretionary spending, the category that includes R&D. So federal funding for R&D, which has grown over the past four decades in the context of an expanding discretionary pie, would suffer reductions in the context of a shrinking one. While the reductions in R&D may not be as severe as in some other discretionary programs, they would still be substantial.

Despite the fact that they arrive at more or less the same endpoint, however, the Administration and congressional plans do differ in at least two ways. Perhaps the most significant difference is in the path they would take between today's budget levels and those of FY 2002. While the congressional plan outlines a steady, downward-sloping curve to a balanced budget in FY 2002, the President's plan calls for a significant increase in R&D between FY 1996 and FY 1997, followed by progressive reductions in subsequent years. Chart 1 (in Appendix E) displays the comparison. Because of this difference between the two trajectories, the aggregate total that would be spent on R&D under the Administration's plan between now and FY 2002 would be substantially more than under the congressional plan.

The second difference has to do with budgets of specific agencies. Under the assumptions used in the AAAS analysis, the President's plan and the congressional budget resolution yield different results for the key R&D agencies in the outyears. The President's budget favors the Administration's technology initiatives, including programs in the Department of Commerce, as well as some of its priorities in energy R&D in the Department of Energy. NASA, which in the President's original (unadjusted) budget had been slated for declining funding between FY 1997 and 2000, followed by significant increases in FY 2001 and 2002, would be hard-hit under the adjusted budget for the last two years, winding up below the congressional budget resolution level. NSF, whose budget had originally been shown to level off in FY 2000 after several years of modest declines, would now decline significantly in FY 2001 and 2002.

Under Congress's plan, these priorities would look somewhat different. NSF would begin to increase after FY 1999. NASA, while declining steadily throughout the period, would be funded at a level higher than that projected under the Administration's plan beginning in FY 1998. Commerce and Energy, on the other hand, would be consistently lower in the congressional projections. The charts displaying these projections are included in Appendix E together with a summary table.

It should be pointed out that the AAAS analyses of the FY 1997 congressional budget resolution and the President's original FY 1997 budget are both backed up by detailed policy statements contained in the reports that accompany the resolution and in budget books. The July adjustments to total discretionary spending outlined in the *Mid-Session Review* (to produce a budget that would balance according to CBO assumptions) were, however, applied in a mechanical fashion equally to all agency budgets. It seems likely that if the Administration were to issue its own revised outyear projections on an agency-by-agency basis the numbers would differ from those shown. The figures would also be affected, of course, by how Congress and the Administration chose to allocate the reductions between the major budget categories of defense and nondefense discretionary spending.

A REALITY CHECK ON OUTYEAR PROJECTIONS: CONCLUDING COMMENTS

Outyear projections serve an important purpose: They show the policy choices and tradeoffs the Administration and Congress have assumed in order to achieve the goal of a balanced budget. Both the President and Congress would achieve a balanced budget primarily through cuts in discretionary spending, including cuts to most of the accounts funding R&D. In both plans, spending on mandatory programs such as Social Security, Medicare, and Medicaid would continue to increase at a rate greater than inflation. In fact in FY 1996, nondefense discretionary spending was the only category of federal spending that both sides agreed to cut. The outlook for the future suggests more of the same.

As actual predictors of the future, however, outyear projections, whether from the Administration's budget or the congressional budget resolution, have always been unreliable. Economic conditions change, priorities change, the international situation changes, political leadership changes, and parties in power change. Looking back over the outyear projections in budgets over the past ten or fifteen years, one would be hard-pressed to find anything that corresponds to today's reality. Thus, the only thing that I can say with certainty about the outyear projections in the President's FY 1997 budget and the FY 1997 Congressional Budget Resolution is that they are not likely to be realized.

Nevertheless, because they tell us something about the problems we face and the choices we must make to overcome them, these outyear projections are worth careful attention, particularly at a macro level. Over the past four decades, except in the 1960s during the heyday of the Apollo Program (which in respect to R&D funding was an exceptional situation), trends in nondefense R&D spending have closely followed trends in overall nondefense discretionary spending, and trends in total federal R&D, including defense, have tracked total discretionary spending. Despite the highly decentralized nature of decision-making in the budget process and the equally decentralized nature of R&D funding in the U.S., R&D has consistently hovered at around 14 percent of total discretionary spending. This suggests that the expansion in federal investment in R&D over the past several decades has resulted not only from a commitment to the "endless frontier" of science and technology, but perhaps as importantly from the general growth of discretionary spending which allowed greater government investments to be made in a variety of areas including S&T. The point is that, while I would not place bets on the precise numbers, if Congress and the President continue to pursue a balanced budget primarily through cuts in discretionary spending, especially nondefense discretionary, then further cuts to federal support of R&D are inevitable.

Appendix A

Excerpt from *Congressional Action on Research & Development in the FY 1996 Budget*. All tables referred to herein are found in that report. "Appendix 2: Definitions" referred to in this section follows.

Methodology and Data Sources

Within the federal budget there is no separately identified R&D budget as such; nor are most appropriations for R&D so labeled except for certain program areas, such as defense. Consequently, most funds for R&D are not line items in an agency's budget but are included within general program funding. The Office of Management and Budget (OMB) requires agencies whose annual R&D funding is greater than $10 million to submit data on their R&D programs as part of their annual budget submissions. Specifically, the agencies provide data (reported on OMB Circular A-11, Exhibit 44A, "Research and Development Activities") on funding levels for basic research, applied research, development, R&D facilities, and R&D support to universities and colleges (see Appendix 2: Definitions). However, agencies differ in their reporting. For example, some agencies classify program direction or management support as R&D; others do not.

In the data tables, the columns "FY 1995 Actual" and "FY 1996 Request" represent the agencies' best estimates of actual and proposed federal funding for R&D collected during the winter and spring by OMB and AAAS. These figures incorporate information provided to OMB by 21 agencies accounting for more than 99 percent of all federal R&D and information collected by AAAS from individual agencies after the budget is prepared. "FY 1996 Final Estimate" figures are based on OMB figures collected in spring 1996, with adjustments to reflect agency information and the final FY 1996 appropriations bill.

Special Note on Table 2. Basic Research by Agency: Most R&D programs contain a mix of basic research, applied research, and development. Agencies determine what proportion of a program's R&D is basic research.

Special Note on Table 3. Major Functional Categories of R&D: All activities in the federal budget are classified into 20 broad functional categories. (AAAS separates the general science, space, and technology function into its subfunctions of General Science and Space). Each function often includes programs from multiple agencies. Each R&D program is assigned to only one function, even though the R&D activity may address several functional concerns. For example, NASA's Mission to Planet Earth program is classified under the Space function, even though its R&D is also closely related to Natural Resources and Environment, as well as General Science.

Definitions

In this report, R&D refers to actual research and development activities as well as R&D facilities.

Research is systematic study directed toward more complete scientific knowledge or understanding of the subject studied. The federal government classifies research as either basic or applied according to the objective of the sponsoring agency.

- In **basic research** the objective is to gain knowledge or understanding of phenomena without specific applications in mind.
- In **applied research** the objective is to gain knowledge or understanding necessary for meeting a specific need.

Development is the systematic use of the knowledge or understanding gained from research directed toward the production of materials; devices; systems; or methods, including design, development, and improvement of prototypes and new processes. It excludes quality control, routine product testing, and production.

R&D funding normally includes those personnel, program supervision, and administrative support costs directly associated with R&D activities. Laboratory equipment is also included. Defense R&D also includes testing, evaluation, prototype development, and other activities which precede actual production.

Funding for **R&D facilities** includes construction, repair, or alteration of physical plant (*e.g.*, reactors, wind tunnels, particle accelerators, or laboratories) used in the conduct of R&D.

The federal R&D funding data in this report are presented in terms of **budget authority**. Budget authority is the initial budget parameter for congressional action on the President's proposed budget. Other R&D data sources may express R&D funding in terms of obligations or outlays. There are also R&D data sources which obtain funding data from funding **recipients** (companies, universities) rather than from funding **sources** (agencies).

Budget authority is the legal authorization to expend funds.

Obligations represent orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when the future payment of money is required.

Outlays represent checks issued and cash payments made during a given period, regardless of when the funds were appropriated or obligated.

As an example, Congress may appropriate $100 million to NASA in FY 1994 for an R&D laboratory. NASA may then issue contracts to build the lab and sign $50 million of the contracts in FY 1994 and $50 million in FY 1995. Upon completion of the lab in FY 1995, NASA may then write checks to the contractors for a total of $100 million. Budget authority would be $100 million in FY 1994; obligations would be split $50 million each in FY 1994 and FY 1995; outlays would be $100 million in FY 1995. In the federal budget process, there is normally a lag between budget authority and outlays for large capital projects and research contracts; budget authority and outlays usually occur in the same year for recurring expenses such as staff salaries.

(Definitions adapted from National Science Foundation, *Federal R&D Funding by Budget Function: Fiscal Years 1993-95*, Arlington, VA, 1994.)

AAAS Analysis. Projected Effects of President's FY 1997 Budget Outyear Projections on Nondefense R&D - Adjusted for OMB's July 1996 Mid-Session Review (all figures in millions of dollars budget authority)

1 of 4

The President's FY 1997 Budget sets out a plan to balance the federal budget by fiscal year 2002. Included in the budget are detailed outyear projections by budget account up to 2002. The President's budget balances according to Office of Management and Budget (OMB) forecasts, but it does not balance according to spring 1996 CBO forecasts. This table calculates the effect of the President's detailed proposals for discretionary spending on nondefense R&D. The methodology used in this analysis is identical to the July 1995 AAAS analysis *Projected Effects of Congressional Budget Resolution on Nondefense R&D* FY 1995 R&D figures are before rescissions enacted in 1995. FY 1996 and 1997 figures represent the latest AAAS estimates of R&D. FY 1998-2002 figures are estimates based on the outyear budget account projections. The President has committed to presenting a CBO-certified balanced budget In a May version of this analysis, AAAS adjusted the outyear projections to reflect CBO's spring 1996 economic assumptions, in accordance with procedures outlined in the President's March budget The President's July 1996 *Mid-Session Review* of the budget outlines a different mix of revenue increases and undistributed cuts to discretionary spending to bring the budget into balance according to CBO's spring 1996 assumptions The additional cuts to discretionary spending in FY 2001 and 2002 totals have been allocated proportionally among all defense and nondefense discretionary accounts

Agency/Program	KEY	R&D* FY 1995 original	R&D FY 1996 est.	R&D FY 1997 request	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est. ***	R&D FY 2002 est. ***	R&D** FY 2002 constant $	constant $ difference 1995-2002
NIH	1	10,840	11,443	11,901	11,901	11,901	11,901	11,781	11,556	9,933	-8.4%
Agcy. Health Care Policy	1	139	65	84	77	70	63	69	75	65	-53.2%
CDC	1,13	318	323	361	327	298	268	295	320	275	-13.4%
FDA	1	206	170	170	156	142	128	141	153	132	-36.2%
Other HHS R&D	2	187	90	118	118	118	118	113	108	93	-50.3%
Total HHS R&D		**11,690**	**12,091**	**12,633**	**12,579**	**12,528**	**12,477**	**12,398**	**12,213**	**10,498**	**-10.2%**
NASA Human Space Flt	1	1,902	1,876	1,817	1,722	1,623	1,523	1,605	1,680	1,444	-24.1%
NASA SAT Space R&D	1	5,072	5,083	5,004	4,787	4,592	4,394	4,581	4,745	4,078	-19.6%
NASA Mission Support	1	1,619	1,612	1,679	1,545	1,406	1,265	1,389	1,510	1,298	-19.8%
NASA SAT Aeronautics	1	882	846	858	855	823	790	814	833	716	-18.8%
NASA Wind Tunnels	3	400	0	0	0	0	0	0	0	0	-100.0%
NASA Allowance	1	0	0	342	0	0	0	0	0	0	- -
Total NASA R&D		**9,876**	**9,416**	**9,700**	**8,908**	**8,443**	**7,972**	**8,389**	**8,768**	**7,537**	**-23.7%**
General Science (Physics)	1	974	972	998	918	835	751	825	898	772	-20.7%
Energy Supply R&D	1	2,210	1,811	1,935	1,859	1,781	1,700	1,782	1,855	1,594	-27.8%
Fossil Energy R&D	1	350	333	271	249	227	204	225	244	210	-40.1%
Energy Conservation R&D	1	396	309	445	458	470	484	479	470	404	2.1%
Clean Coal Technology	1	37	150	0	313	0	0	0	0	0	-100.0%
Uranium Enrichment	1	3	3	1	1	1	1	1	1	1	-72.8%
DOE allowance	1	0	0	216	0	0	0	0	0	0	- -
Total DOE nondef R&D		**3,969**	**3,577**	**3,866**	**3,798**	**3,314**	**3,141**	**3,311**	**3,467**	**2,980**	**-24.9%**

(continued)

AAAS Analysis. Projected Effects of President's FY 1997 Budget Outyear Projections on Nondefense R&D - JULY ADJUSTMENT July 19, 1996

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Agency/Program	KEY	R&D* FY 1995 original	R&D FY 1996 est.	R&D FY 1997 request	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est. ***	R&D FY 2002 est. ***	R&D** FY 2002 constant $	constant $ difference 1995-2002
Res. & Related Activities	1	2,061	2,138	2,289	2,295	2,301	2,307	2,283	2,241	1,926	-6.5%
Academic Research Infra.	1	250	100	0	0	0	0	0	0	0	-100.0%
Major Res. Equipment	1	126	70	95	95	95	95	94	92	79	-37.3%
R&D in Edu. and Hum. Res.	1	107	93	95	95	95	95	94	92	79	-25.9%
Total NSF R&D		**2,544**	**2,401**	**2,479**	**2,485**	**2,491**	**2,497**	**2,472**	**2,425**	**2,084**	**-18.1%**
Agri Research Serv.	1	752	702	766	707	646	585	638	691	594	-21.0%
CSREES	1	489	452	403	372	339	305	335	362	312	-36.3%
Economics Research Serv.	1	54	53	55	51	46	42	45	50	43	-20.3%
Natl Agric. Stats Service	4	4	4	4	4	4	4	4	4	3	-12.2%
Foreign Agricultural Serv	4	1	1	1	1	1	1	1	1	1	-30.4%
Forest Service	1	204	181	183	171	160	147	158	167	144	-29.5%
Other USDA R&D	4	36	32	32	32	32	32	31	29	25	-29.5%
Total USDA R&D		**1,540**	**1,425**	**1,444**	**1,337**	**1,228**	**1,116**	**1,212**	**1,305**	**1,121**	**-27.2%**
USGS (Incl NBS)	1	535	516	531	498	464	431	459	486	418	-21.9%
Bureau of Mines	5	103	56	0	0	0	0	0	0	0	-100.0%
Nat'l Park Service	4	19	12	12	12	12	12	12	11	9	-50.1%
Other Interior R&D	4	30	38	37	37	37	37	36	34	29	-1.6%
Total Interior R&D		**686**	**622**	**580**	**547**	**513**	**480**	**506**	**531**	**457**	**-33.4%**
FHWA (Highway Admin)	4	277	256	306	306	306	306	295	281	242	-12.6%
Federal Transit Admin.	1	21	16	15	13	12	11	12	13	11	-44.7%
Maritime Admin.	4	3	0	2	2	2	2	2	2	2	-41.5%
Federal Railroad Admin.	6	28	30	28	25	23	21	22	24	21	-24.3%
Federal Aviation Admin.	7	292	233	241	225	209	193	205	218	187	-35.9%
Other Transportation R&D	4	68	66	80	80	80	80	77	73	63	-7.0%
Total DOT R&D		**687**	**602**	**671**	**651**	**632**	**612**	**613**	**612**	**526**	**-23.5%**
NOAA R&D Facils.	4	38	11	9	9	9	9	8	8	7	-82.1%
NOAA Operations, Res & Facils R&D	1	531	508	542	577	579	574	550	534	459	-13.5%
Other NOAA R&D	8	19	17	17	15	15	15	14	14	12	-36.3%
NIST Sci & Technical Res Service	1	214	208	218	218	218	218	216	212	182	-15.0%

(continued)

AAAS Analysis. Projected Effects of President's FY 1997 Budget Outyear Projections on Nondefense R&D - JULY ADJUSTMENT July 19, 1996

Agency/Program	KEY	R&D* FY 1995 original	R&D FY 1996 est.	R&D FY 1997 request	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est. ***	R&D FY 2002 est. ***	R&D** FY 2002 constant $	constant $ difference 1995-2002
(DOC continued)											
NIST ATP	1	409	208	324	331	338	345	342	336	289	-29.4%
NIST Construction	1	63	-15	105	97	88	79	87	95	82	29.4%
Econ. Develop. Admin.	4	1	1	2	2	2	2	1	1	1	137.0%
Other Commerce R&D	4	10	11	11	11	11	11	10	10	8	-16.2%
Total Commerce R&D		**1,284**	**948**	**1,226**	**1,269**	**1,259**	**1,252**	**1,230**	**1,209**	**1,040**	**-19.0%**
Total EPA R&D	11	**619**	**528**	**628**	**646**	**665**	**683**	**676**	**663**	**570**	**-8.0%**
Total Education R&D	4	175	175	182	182	182	182	175	167	144	-17.8%
Total AID R&D	12	314	175	181	173	164	155	162	168	145	-53.9%
Total Veterans R&D	1	297	266	267	245	223	202	221	241	207	-30.3%
Total NRC R&D	1	82	59	59	59	59	59	57	54	47	-43.2%
Total Smithsonian R&D	1	135	135	147	135	123	111	122	132	114	-15.8%
Total TVA R&D	1	89	65	77	68	62	56	61	67	57	-35.4%
Total Corps R&D	9	55	48	45	42	38	34	37	40	35	-36.4%
Total Labor R&D	4	62	34	38	38	38	38	37	35	30	-51.4%
Total HUD R&D	1	41	34	48	44	41	36	40	43	37	-8.5%
Total Other R&D	10	171	147	171	171	171	171	165	158	135	-20.7%
TOTAL NONDEFENSE R&D		**34,312**	**32,746**	**34,441**	**33,368**	**32,174**	**31,276**	**31,883**	**32,298**	**27,762**	**-19.1%**

Data from *Budget of the United States Government for Fiscal Year 1997* (CD-ROM)
Public Budget Database table "Budget Authority and offsetting receipts, 1976-2002"

* - Source: *AAAS Report XX: Research and Development FY 1996*. This analysis uses FY 1995 original as the baseline to reflect the seven-year timetable for balancing the budget and to reflect the R&D budget before FY 1995 rescissions, which were the first step toward a balanced budget.

** - expressed in FY 1995 dollars. Adjusted for inflation according to GDP deflators.

*** - The figures for FY 2001 and 2002 are based on detailed budget account projections in the President's budget plan that are contingent on CBO certification in spring 1996 that the budget will lead to a zero deficit in FY 2002. In May, CBO certified that the plan would not lead to a balanced budget. A May version of this analysis (continued) adjusted the outyear projections to bring the budget into balance according to CBO assumptions based on AAAS' interpretation of instructions contained in the President's March budget. In July, the President issued the *Mid-Session Review of the 1997 Budget* which specifies a mix of undistributed discretionary spending cuts and sunset of tax cuts and other proposals to bring the budget into balance according to CBO projections. This mix of cuts and revenues differs from the cuts assumed in the May version of this analysis. The original FY 2001 and 2002 projections have been adjusted downward by allocating the discretionary spending cuts necessary to produce a balanced budget according to CBO projections proportionally among all defense and nondefense discretionary accounts.

KEY OF ASSUMPTIONS:

1 = Based on specific outyear projection for account in Public Budget Database, assuming R&D as percent of account remains constant at the FY 1997 ratio.
2 = Not specifically mentioned in outyear projections; assumes freeze at FY 1997 level; Social Security Administration included.
3 = $400 million in original BA for FY 1995; later reallocated to SAT as $35 million for FY 95 and $365 million for FY 98.
4 = Not specifically mentioned in outyear projections; assumes freeze at FY 1997 level.
5 = Program eliminated.
6 = Based on outyear projections for Railroad R&D and Next Generation High-Speed Rail account, assuming R&D as percent of combined accounts remains constant at FY 1997 ratio.
7 = Based on specific outyear projection for Research, Engineering and Development account; assumes other FAA R&D stays constant at FY 1997 level.
8 = R&D in Fleet Modernization and Promote and Develop Fisheries; assumes R&D as percent of combined accounts remains constant at FY 1997 ratio.
9 = R&D in Oil spill research; general expenses; O&M; general investigations; assumes R&D as percent of combined accounts remains constant at FY 1997 ratio.
10 = Justice, USPS and other small agency R&D frozen at FY 1997 levels.
11 = EPA R&D projections based on outyear projections for EPA Science and Technology account.
12 = Based on outyear projections for Sustainable Development Assistance and Development Fund for Africa, assuming R&D as percent of these accounts remains constant at FY 1997 ratio.
13 = CDC revised its classification of its R&D programs, leading to an R&D total higher than originally reported.

	1995*	1996	1997	1998	1999	2000	2001***	2002***
Nondefense R&D in FY 1995 $	**34,312**	**32,105**	**33,041**	**31,320**	**29,521**	**28,079**	**28,008**	**27,762**
Annual % change in constant $ from previous year		**-6.4%**	**2.9%**	**-5.2%**	**-5.7%**	**-4.9%**	**-0.3%**	**-0.9%**

	1995*	1996	1997	1998	1999	2000	2001***	2002***	1995-2002
Deflators	1.2879	1.3136	1.3425	1.3721	1.4036	1.4345	1.4661	1.4983	1.1634
deflators from OMB, *Budget of the United States Government FY 1997* Historical Tables 10.1.									
Annual projected inflation (change from previous year)		2.0%	2.2%	2.2%	2.3%	2.2%	2.2%	2.2%	

APPENDIX C: CALCULATING THE REDUCTIONS IN DISCRETIONARY SPENDING REQUIRED TO MEET CBO PROJECTIONS FOR FY 2001 AND 2002

AAAS's May analysis was based on a specific footnote contained in the President's budget. Found in several places in the President's March 1996 budget for FY 1997, including Table S-5 in the *Budget Supplement* volume, the footnote states:

> Note: The President is committed to producing a balanced budget by 2002 under the economic and technical assumptions of the Congressional Budget Office (CBO). If under CBO's revised economic and technical assumptions, which will be released later this spring, there would be a deficit in 2002, the discretionary proposals will be reduced by the amount necessary to eliminate that deficit.

In its *Economic and Budget Outlook: Fiscal Years 1997-2006*, published in May, the Congressional Budget Office estimates that "under the President's basic policies," the deficit would be $81 billion in FY 2002 (p. 62). The AAAS calculation used a literal interpretation of these two statements by OMB and CBO, reducing the President's estimate of discretionary outlays for FY 2001 by $40 billion and discretionary outlays for FY 2002 by $81 billion, and reduces budget authority by the same amounts.

However, there was some ambiguity in the way the President's outyear plans were presented in his March budget, and this allows for a different interpretation which results in somewhat smaller adjustments to discretionary spending, including R&D, after FY 2000. This alternative interpretation is based upon a provision described on p. 14 of the *Budget Supplement* volume of the President's FY 1997 budget and spelled out in Table S-5 in that document:

> The budget also includes a "trigger" to ensure that the budget reaches balance under either CBO or OMB assumptions. Under the trigger, most of the tax cuts end after 2000 if the deficit is not at least $20 billion below CBO's initial estimate for that year. If, however, the deficit is at least $20 billion below the estimate, then the budget distributes the additional savings in the following order:

- first, it maintains the tax cut after the year 2000;
- second, it reduces the cuts in discretionary spending; and
- third, it splits any additional savings evenly among more tax cuts, more reductions in the discretionary cuts, and more deficit reduction.

If one goes by the provisions of this "trigger," the President's tax cut would be sunset at the end of calendar year 2000 and other adjustments would be made. The reduction in discretionary spending in FY 2002 required to make the President's budget conform to the CBO conditions would therefore be about $46 billion instead of $81 billion, resulting in smaller reductions in R&D projections, depending once again on how these reductions are distributed.

It should be noted that in the spring CBO report, CBO indicates that if the trigger is "pulled," then the President's budget would indeed balance in FY 2002. The difficulty that AAAS saw in using the trigger for current planning, however, was that (as stated in the quote above) it would not be "pulled" until the end of FY 2000 (September 30, 2000), which is the earliest the Administration could actually know whether the deficit "is at least $20 billion below the[CBO] estimate." For this reason, in the absence of any statements from the Administration clarifying the issue, AAAS chose to use the literal ($81 billion) interpretation of the required reductions. OMB's *Mid-Session Review*, however, resolves this ambiguity by stating in Tables 15 and 16 (page 31) that the Administration would exclude the "fiscal dividend" -- i.e., "pull the trigger" -- in order to balance the budget under the CBO economic assumptions. AAAS has therefore revised its analysis, applying the smaller reductions to its estimates of R&D in the President's outyear projections for FY 2001 and 2002.

AAAS Analysis. Projected Effects of FY 1997 Concurrent (Final) Budget Resolution on Nondefense R&D

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(4 pages - Corrected Version 6/21) (all figures in millions of dollars budget authority)

The concurrent budget resolution for FY 1997 is a plan to balance the federal budget by fiscal year 2002. The House version of the resolution contained detailed policy assumptions on the cuts necessary to achieve a balanced budget, including cuts to R&D programs. This table calculates the effects on nondefense R&D of the budget resolution drafted by the majority staff of the House Budget Committee (May, 1996). It has been adjusted to reflect changes made to the House resolution in the final conference report of the budget resolution (H Rpt. 104-612). The methodology used in this analysis is identical to the July 1995 AAAS analysis *Projected Effects of (FY 1996) Congressional Budget Resolution on Nondefense R&D*. This analysis is companion to a similar analysis of the President's FY 1997 budget plan. FY 1995 R&D figures are before rescissions enacted in 1995. FY 1996 figures represent the latest AAAS estimates of R&D. FY 1997-2002 figures are estimates based on the detailed policy assumptions accompanying the House resolution, adjusted for changes made in the conference report of the concurrent budget resolution. The program allocations in the budget resolution are only guides, and are not binding on appropriators

Agency/Program	KEY	R&D* FY 1995 original	R&D FY 1996 est.	R&D FY 1997 est.	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est.	R&D FY 2002 est.	R&D** FY 2002 constant $	constant $ difference 1995-2002
NIH	18	10,840	11,443	11,446	11,446	11,446	11,446	11,446	11,446	9,838	-9.2%
Agcy. Health Care Policy	1	139	65	65	65	65	65	65	65	56	-59.7%
CDC	2	318	323	154	154	154	154	154	154	132	-58.4%
FDA	1	206	170	170	170	170	170	170	170	146	-29.1%
Other HHS R&D	1,3	187	90	90	90	90	90	90	90	78	-58.5%
Total HHS R&D		**11,690**	**12,091**	**11,925**	**11,925**	**11,925**	**11,925**	**11,926**	**11,925**	**10,250**	**-12.3%**
NASA Human Space Flt	1,20	1,902	1,876	1,876	1,857	1,838	1,838	1,838	1,876	1,612	-15.2%
NASA SAT Space R&D	1,17	5,072	5,083	4,983	4,730	4,692	4,692	4,711	4,783	4,111	-18.9%
NASA Mission Support	1,20	1,619	1,612	1,612	1,595	1,579	1,579	1,579	1,612	1,385	-14.4%
NASA SAT Aeronautics	1,19	882	846	846	763	735	662	640	627	539	-38.9%
NASA Wind Tunnels	4	400	0	0	0	0	0	0	0	0	-100.0%
Total NASA R&D		**9,876**	**9,416**	**9,316**	**8,946**	**8,845**	**8,772**	**8,769**	**8,897**	**7,648**	**-22.5%**
General Science (Physics)	5,20	974	972	1,000	981	971	976	976	991	851	-12.6%
Energy Supply R&D	5,19	2,210	1,811	1,811	1,753	1,726	1,709	1,653	1,594	1,370	-38.0%
Fossil Energy R&D	6,19	350	333	333	88	45	0	0	0	0	-100.0%
Energy Conservation R&D	6,19	396	309	309	74	37	0	0	0	0	-100.0%
Clean Coal Technology	7	37	150	0	0	0	0	0	0	0	-100.0%
Uranium Enrichment	1	3	3	3	3	3	3	3	3	3	-7.9%
Total DOE nondef R&D		**3,969**	**3,677**	**3,456**	**2,899**	**2,782**	**2,688**	**2,631**	**2,587**	**2,224**	**-44.0%**
Res. & Related Activities	8,20	2,061	2,138	2,201	2,206	2,249	2,317	2,398	2,507	2,155	4.6%
Academic Research Infra.	1	250	100	100	100	100	100	100	100	86	-65.6%

(continued)

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Agency/Program	KEY	R&D* FY 1995 **original**	R&D FY 1996 est.	R&D FY 1997 est.	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est.	R&D FY 2002 est.	R&D** FY 2002 constant $	constant $ difference 1995-2002
(NSF continued)											
Major Res. Equipment	1	126	70	70	70	70	70	70	70	60	-52.2%
R&D in Edu. and Hum. Res.	9,20	107	93	94	84	80	79	79	80	69	-35.4%
Total NSF R&D		**2,544**	**2,401**	**2,464**	**2,460**	**2,498**	**2,566**	**2,647**	**2,758**	**2,371**	**-6.8%**
Agri Research Serv.	0,19	752	702	702	611	627	632	659	708	608	-19.1%
CSREES	0,19	489	452	452	380	390	394	410	441	379	-22.6%
Economics Research Serv.	1	54	53	53	53	53	53	53	53	46	-14.8%
Natl Agric. Stats Service	1	4	4	4	4	4	4	4	4	3	-4.5%
Foreign Agricultural Serv	1	1	1	1	1	1	1	1	1	1	-24.3%
Forest Service	1	204	181	181	181	181	181	181	181	156	-23.7%
Other USDA R&D	1	36	32	32	32	32	32	32	32	27	-23.3%
Total USDA R&D		**1,640**	**1,426**	**1,425**	**1,262**	**1,288**	**1,297**	**1,341**	**1,419**	**1,220**	**-20.8%**
USGS (incl NBS)	1	535	516	516	516	516	516	516	516	444	-17.0%
Bureau of Mines	7	103	56	0	0	0	0	0	0	0	-100.0%
Nat'l Park Service	1	19	12	12	12	12	12	12	12	10	-45.7%
Other Interior R&D	1	30	38	38	38	38	38	38	38	33	10.0%
Total Interior R&D		**686**	**622**	**566**	**566**	**566**	**566**	**566**	**566**	**487**	**-29.0%**
FHWA (Highway Admin)	5,19	277	256	256	115	85	80	75	70	61	-78.1%
Federal Transit Admin.	7	21	16	0	0	0	0	0	0	0	-100.0%
Maritime Admin.	7	3	0	0	0	0	0	0	0	0	-100.0%
Federal Railroad Admin.	5,19	28	30	30	30	30	30	30	30	26	-6.6%
Federal Aviation Admin.	5	292	233	233	227	207	207	207	207	178	-39.0%
Other Transportation R&D	11	68	66	56	58	58	56	56	56	48	-28.4%
Total DOT R&D		**687**	**602**	**576**	**429**	**379**	**374**	**369**	**364**	**313**	**-54.4%**
NOAA R&D Facils.	1	38	11	11	11	11	11	11	11	10	-74.4%
NOAA Operations, Res & Facils R&D	5,19	531	508	508	468	453	440	440	440	378	-28.8%
Other NOAA R&D	2,19	19	17	17	17	17	17	17	17	14	-23.6%
NIST Sci & Technical Res Service	13	214	208	232	239	246	253	260	268	230	7.6%
NIST ATP	7	409	208	0	0	0	0	0	0	0	-100.0%

(continued)

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Agency/Program	KEY	R&D* FY 1995 original	R&D FY 1996 est.	R&D FY 1997 est.	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est.	R&D FY 2002 est.	R&D** FY 2002 constant $	constant $ difference 1995-2002
(DOC continued)											
NIST Construction	5	63	-15	105	60	60	60	60	60	52	-18.1%
Econ. Develop. Admin.	14	1	1	0	0	0	0	0	0	0	-100.0%
Other Commerce R&D	14	10	11	7	7	7	7	7	7	6	-39.2%
Total Commerce R&D		**1,284**	**948**	**880**	**802**	**794**	**788**	**795**	**803**	**690**	**-46.3%**
Total EPA R&D	6	**619**	**528**	**490**	**490**	**490**	**490**	**490**	**490**	**421**	**-31.9%**
Total Education R&D	1	175	175	175	175	175	175	175	175	150	-13.9%
Total AID R&D	15	314	175	130	63	14	0	0	0	0	-100.0%
Total Veterans R&D	1	297	266	266	266	266	266	266	266	229	-23.0%
Total NRC R&D	1	82	59	59	59	59	59	59	59	51	-38.2%
Total Smithsonian R&D	5	135	135	135	133	118	106	106	106	91	-32.2%
Total TVA R&D	5	89	65	45	45	45	45	45	45	39	-56.3%
Total Corps R&D	1	55	46	46	46	46	46	46	46	40	-27.6%
Total Labor R&D	1	62	34	34	34	34	34	34	34	29	-52.7%
Total HUD R&D	1	41	34	34	34	34	34	34	34	29	-27.8%
Total Other R&D	16	171	147	147	147	147	147	147	147	126	-26.0%
TOTAL NONDEFENSE R&D		**34,312**	**32,746**	**32,170**	**30,781**	**30,507**	**30,378**	**30,446**	**30,723**	**26,408**	**-23.0%**

Data from House Budget Committee's detailed policy assumptions for the FY 1997 House Budget Resolution; adjusted based on conference report for "Concurrent Resolution on the Budget" (House Report 104-612).

* - Source: *AAAS Report XX: Research and Development FY 1996*. This analysis uses FY 1995 original as the baseline to reflect the seven-year timetable for balancing the budget and to reflect the R&D budget before FY 1995 rescissions, which were the first step toward a balanced budget.
** - expressed in **FY 1996** dollars. Adjusted for inflation according to GDP deflators.

KEY OF ASSUMPTIONS:
1 = No policy changes in House budget resolution; freeze at baseline FY 1996 spending level, assuming R&D as percent of account remains constant at the FY 1996 ratio.

2 = Elimination of the National Institute for Occupational Safety and Health; all other R&D frozen at FY 1996 level. CDC revised its classification of its R&D programs, leading to a FY 1995 total higher than originally reported.
3 = Includes R&D in the Social Security Administration.
4 = $400 million in original BA for FY 1995, later reallocated to SAT as $35 million for FY 95 and $365 million in FY 98. Proposal would rescind the FY 1998 budget authority.
5 = Based on specific policy changes in House budget resolution, assuming R&D as percent of account remains constant at FY 1996 ratio.
6 = Budget resolution assumes phased elimination of program.
7 = Budget resolution assumes immediate elimination of program.
8 = Funds added to "basic science" at NSF; table adds funds to R&RA, assuming R&D as percent of R&RA remains constant at FY 1996 ratio.
9 = Funds cut from "other programs" at NSF; table subtracts funds from EHR, assuming R&D as percent of EHR remains constant at FY 1996 ratio.
10 = Funds cut from "Agricultural Research and Extensions"; table subtracts funds from ARS and CSREES, assuming R&D as percent of accounts remains constant at FY 1996 ratio.
11 = Elimination of RSPA and Office of Secretary R&D; other R&D frozen at FY 1996 level.
12 = Elimination of Fleet Modernization R&D; other R&D frozen at FY 1996 level.
13 = Funds added to "NIST's Core Programs"; table adds funds to STRS, assuming R&D as percent of account remains constant at FY 1996 ratio.
14 = House budget resolution assumes elimination of Commerce Dept.; Census R&D assumed to survive at FY 1996 level.
15 = Assumes phased elimination of AID R&D because of cuts to "Development Assistance"; AID would be merged with State Dept.
16 = Justice, USPS and other small agency R&D frozen at FY 1997 levels.
17 = Assumes $1.8 billion cut over six years from Mission to Planet Earth. Distributed at $300 million a year. See also 20.
18 = Specific spending level specified in conference report (H Rpt 104-612).
19 = Additional funds allocated in conference report over House resolution, distributed proportionally among activities in the function.
20 = Cuts (in some years) and additions (in other years) in conference report over House resolution, distributed proportionally.

	1995*	1996	1997	1998	1999	2000	2001	2002
Nondefense R&D in FY 1995 $	**34,312**	**32,105**	**30,862**	**28,892**	**27,992**	**27,274**	**26,746**	**26,408**
Annual % change in constant $ from previous year		**-6.4%**	**-3.9%**	**-6.4%**	**-3.1%**	**-2.6%**	**-1.9%**	**-1.3%**

	1,995	1996	1997	1998	1999	2000	2001	2002	1995-2002
Deflators	1.2879	1.3136	1.3425	1.3721	1.4036	1.4345	1.4661	1.4983	1.1634

deflators from OMB, *Budget of the United States Government FY 1997* Historical Tables 10.1.

Annual projected inflation (change from previous year)		2.0%	2.2%	2.2%	2.3%	2.2%	2.2%	2.2%

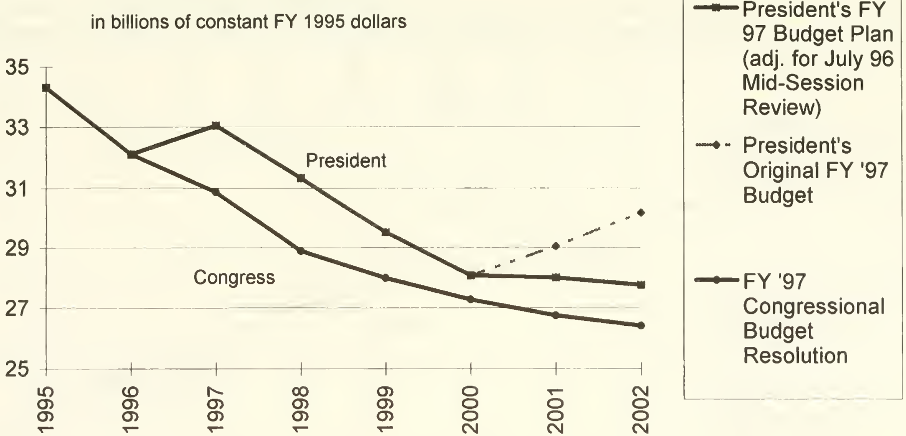
Summary Table Projected Federal Spending on Nondefense R&D, FY 1995-2002
President's FY 1997 Budget - Adjusted for OMB's July 1996 Mid-Session Review, and
Concurrent (Final) FY 1997 Budget Resolution
(in millions of current dollars budget authority)

	R&D FY 1995 original*	R&D FY 1996 est.	R&D FY 1997 est.	R&D FY 1998 est.	R&D FY 1999 est.	R&D FY 2000 est.	R&D FY 2001 est.	R&D FY 2002 est.	FY 2002 in constant 1995 $ **	% change constant $ 1995-2002
NIH (President)	10,840	11,443	11,901	11,901	11,901	11,901	11,781	11,556	9,933	-8.4%
NIH (Congress)	*10,840*	*11,443*	*11,446*	*11,446*	*11,446*	*11,446*	*11,446*	*11,446*	*9,838*	*-9.2%*
NASA (President)	9,875	9,416	9,700	8,908	8,443	7,972	8,389	8,768	7,537	-23.7%
NASA (Congress)	*9,875*	*9,416*	*9,316*	*8,946*	*8,845*	*8,772*	*8,769*	*8,897*	*7,648*	*-22.5%*
DOE nondef (President)	3,969	3,577	3,866	3,798	3,314	3,141	3,311	3,467	2,980	-24.9%
DOE nondef. (Congress)	*3,969*	*3,577*	*3,456*	*2,899*	*2,782*	*2,688*	*2,631*	*2,587*	*2,224*	*-44.0%*
NSF (President)	2,544	2,401	2,479	2,485	2,491	2,497	2,472	2,425	2,084	-18.1%
NSF (Congress)	*2,544*	*2,401*	*2,464*	*2,460*	*2,498*	*2,566*	*2,647*	*2,758*	*2,371*	*-6.8%*
USDA (President)	1,540	1,425	1,444	1,337	1,228	1,116	1,212	1,305	1,121	-27.2%
USDA (Congress)	*1,540*	*1,425*	*1,425*	*1,262*	*1,288*	*1,297*	*1,341*	*1,419*	*1,220*	*-20.8%*
All Other R&D (President)	5,544	4,484	5,051	4,939	4,797	4,648	4,719	4,777	4,106	-25.9%
All Other R&D (Congress)	*5,544*	*4,484*	*4,063*	*3,768*	*3,648*	*3,610*	*3,613*	*3,615*	*3,107*	*-43.9%*
TOTAL NONDEFENSE R&D										
President	**34,312**	**32,746**	**34,441**	**33,388**	**32,174**	**31,275**	**31,883**	**32,298**	**27,762**	**-19.1%**
Congress	***34,312***	***32,746***	***32,170***	***30,781***	***30,507***	***30,378***	***30,446***	***30,723***	***26,408***	***-23.0%***

Summary of two AAAS analyses: *Projected Effects of President's FY 1997 Budget Outyear Projections on Nondefense R&D - Adjusted for July 1996 Mid-Session Review* (July 19, 1996) and *Projected Effects of Concurrent (Final) FY 1997 Budget Resolution on Nondefense R&D* (Corrected version - June 21, 1996).
For agency end program details, and detailed information on methodology, please refer to these analyses.
* - This analysis uses the original FY 1995 funding level as the baseline to reflect the seven-year timetable for balancing the budget.
** - expressed in FY 1995 dollars. Adjusted for inflation according to GDP deflators.
FY 1995 R&D figures are before rescissions enacted in 1995. FY 1996 figures represent the latest AAAS estimates of R&D in FY 1996 appropriations. FY 1997-2002 figures are AAAS estimates based on projections contained in the President's FY 1997 budget and the proposed House FY 1997 budget resolution policy assumptions, adjusted for changes in the final budget resolution. The two analyses are available on the World Wide Web at http://www.aaas.org/spp/dspp/rd/rdwwwpg.htm

Appendix E

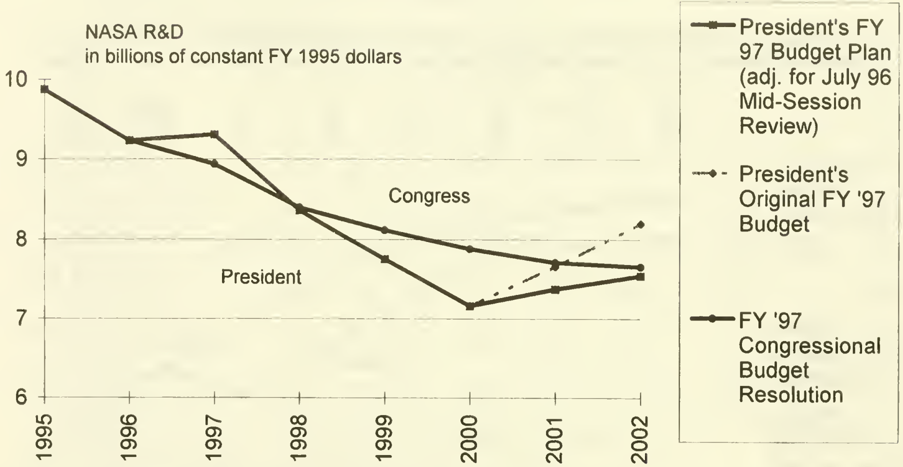
Chart 1. Projected Federal Spending on Nondefense R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

AAAS - July 19, 1996

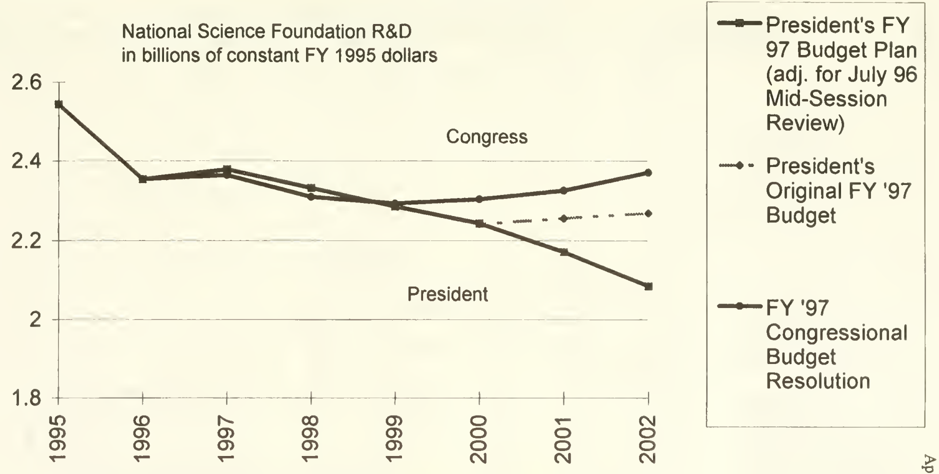
Chart 2. Projected Federal Spending on NASA R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

AAAS - July 19, 1996

Chart 3. Projected Federal Spending on NSF R&D, FY 1995-2002

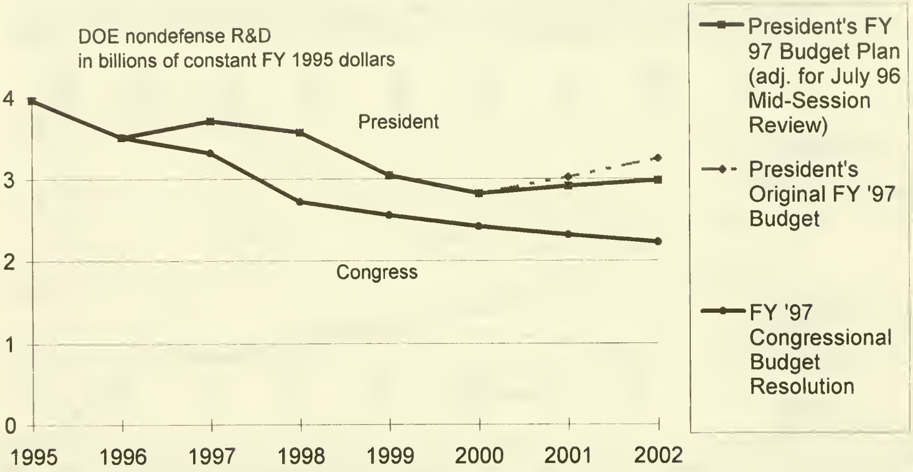


Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

Appendix E

AAAS - July 19, 1996

Chart 4. Projected Federal Spending on DOE Nondefense R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

AAAS - July 19, 1996

The CHAIRMAN. Thank you, Dr. Teich and Mr. Blum.

First of all, let me say, Dr. Teich, I could not agree more that, coming at it as a budgeteer, unless we take on the entitlements at some point, we are going to wreck not only R&D in this country, we are going to wreck education and a whole lot of other things, because there is no way that you can get to a balanced budget doing it on the back of only discretionary spending.

I mean, the big programs that have to be challenged are the programs that are entitlement programs, and, you know, we have got to get a bipartisan consensus toward getting those entitlement programs in-hand, if we have any chance at all at having discretionary spending survive into the next century.

So, you are absolutely right.

Let me deal with just a couple of questions here. I just want to get a couple of things on the table in my questioning period so that we have a base off which to have other members asking some questions.

Well, Dr. Teich, your analysis that is included in here, and the percentages you use and so on, is all civilian R&D, and does not include any Defense R&D; is that right?

Dr. TEICH. That is right.

The CHAIRMAN. But, Mr. Blum, when you are talking about the discretionary budget, that, of course, does include Defense; is that correct?

Mr. BLUM. Yes, sir.

The CHAIRMAN. Just for the record, as Mr. Brown has pointed out, the chart that he distributed also includes the Defense R&D, so that as a mix of the overall discretionary money available for R&D, that analysis includes Defense.

Mr. Blum's talking about discretionary spending includes Defense, but the figures that Dr. Teich is talking about are the civilian side alone.

I point that out only because that in looking at the Administration's budget numbers, for example, they have gone from a figure of military R&D of $42 billion in Fiscal 1993, to a figure somewhere around $38 billion in Fiscal Year 1997, projected for 1997.

So that $4 billion drop in Defense R&D affects the overall picture of R&D. It does not necessarily concern what this hearing is about, which concentrates on the civilian R&D.

Mr. Teich—or, Dr. Teich, do any of the analyses that you have done in yours, look at the overall issue of prioritizing the research? While we are reducing the amounts of overall money, did you take a look at the effect on individual agencies where, in some cases, the money is being cut dramatically, but, in other cases, where there is actually an increase in the spending as a result of priorities being assigned, even within a declining budget scenario?

Dr. TEICH. We did at a very gross level.

We looked at agency budgets, to the agency budgets for R&D, to the extent that we could get the information out of the projections that were available.

When we did the adjustments, however, we did not have information on any kind of priority decisions as to how those reductions needed to match the CBO projections would be allocated, so those are essentially across-the-board and do not reflect real priority decisions.

The CHAIRMAN. So, essentially, in analyzing the Congressional Budget where we have laid out specific policies to go with that, you are, in fact, analyzing those priorities at that point; but with regard to the OMB figures, since you have to project the priorities, you are essentially doing an across-the-board analysis in your——

Dr. TEICH. Where there are—in the original Administration budget where there are priorities stated explicitly, then we have incorporated those, the same way that we have done in the Congressional Budget Resolution.

But, as I said, in doing this most recent adjustment that, as I said we did last week in terms of the mid-session review, which reduces those last two outyears, in order to conform to CBO's economic assumptions, there we have just done it across-the-board.

The CHAIRMAN. Okay, now, when you did your mid-season review that gave the Administration credit for some better economic figures and so on, did you also adjust the Congressional budget figures to also reflect those more optimistic economic scenarios?

Dr. TEICH. No. We used the economic—we used OMB inflation assumptions for both. And we used—the final figures that you see in Chart 1 here apply the CBO economic assumptions about the future to both the President's—we tried to put them both on an equal footing here, both the President's and the Congressional budget.

The CHAIRMAN. But if I look at Mr. Blum's chart, Mr. Blum's chart seems to indicate that the better economic assumptions gave the Administration about $4 billion of additional help in the year 2001 and 2002.

Dr. TEICH. Right.

The CHAIRMAN. That the $81 billion projection has gone down to about $77 billion of projected need in that chart.

You are looking as though I misstated you, Mr. Blum.

Mr. BLUM. I am sorry, Mr. Chairman. I was just not following where your numbers are coming from.

The CHAIRMAN. And I want to make certain that we have it absolutely right.

You show in your chart, Table Number 1, that the contingent proposals are $25 billion in 2001, and that in 2002, it is $52 billion?

Mr. BLUM. Yes, sir.

The CHAIRMAN. Now, that is $77 billion.

Mr. BLUM. Yes.

The CHAIRMAN. I think it compares, does not it, to the $81 billion that was a part of the Administration's original budget?

Mr. BLUM. No.

The CHAIRMAN. When CBO testified before the Budget Committee, they were indicating that there was an $81 billion contingency question.

Mr. BLUM. No, Mr. Chairman.

Actually, at that time, in the March budget, it was a $67 billion contingency. The reason why it has gone up from 67 to 77 is that OMB's mid-session review assumptions are a bit more optimistic than they were for the President's budget, and therefore they were able to allocate, in essence, additional spending for discretionary programs in the years 2001 and 2002.

Therefore, the contingency reduction amount grew somewhat. But the bottom line is——

The CHAIRMAN. So, what I am trying to find out here is—so you are saying essentially that the mid-session review is a $10-billion plus-up for the Administration?

Mr. BLUM. Oh, I am sorry. Mr. Horny just corrected me. The $81 billion reduction in the year 2002 originally included not only the reductions in discretionary spending but also the effect in 2002 of not continuing the President's proposed tax cuts beyond the year 2000.

The CHAIRMAN. Right.

Mr. BLUM. So you cannot say that all of the $81 billion applied to discretionary spending programs. In fact, only $67 billion did.

The CHAIRMAN. Okay, all right.

So that is the difference, is that the President, after reducing taxes up to the year 2000, then increases taxes again after the year 2000, and so we are talking about $67 billion of discretionary.

You are now saying it is $77 billion of discretionary, and so there is a $10 billion plus, and I just want to clarify this.

So, Dr. Teich, that $10 billion is what you have now allocated to the programs?

Dr. TEICH. No, that is included in our analysis. Our analysis assumes the CBO economic assumptions.

That is, we—for the President's spending in those last two outyears, we assume the lower case.

We assume that CBO is correct, as the President has agreed to do as well in order—as part of the agreement last January.

So we assume that CBO's numbers are correct, and we take as our projections for 2001 and 2002, the President's numbers, as adjusted, to meet those CBO assumptions, and that does not include the extra money that you are speaking of.

We are on the same footing.

The CHAIRMAN. So, as far as you are concerned, your analysis has both Congressional and OMB on the same footing in your analysis?

Dr. TEICH. That is right.

The CHAIRMAN. That is all I want to establish.

Mr. Brown?

Mr. BROWN. Both of you gentlemen, I think, have indicated that the outyear projections out to 2002 get a little fuzzy, and, as a matter of fact, you cannot actually track R&D spending, but in the case of CBO, you have sort of assumed that it would follow discretionary spending as a whole; is that correct?

Dr. TEICH. That is correct.

Mr. BROWN. Now, that means that—and I think you have indicated this in your testimony—since you cannot be sure of what priorities will be and what economic conditions will be, that it is quite possible that, given a different real world outcome and a different set of priorities, in either of these budgets there could be deviations for that small item that you cannot really track, civilian R&D.

It could go either up or down, depending upon the priorities of the Congress and the President and economic conditions?

You, Dr. Teich, have made an effort to sort of do a little finer analysis, but your degree of certainty is still—you recognize the fact that either priorities or economic conditions could change that?

Dr. TEICH. We have tried to apply those kinds of caveats to the analysis, yes.

Mr. BROWN. All right. I would like to see if either one of you could speculate, or would like to comment about what the real-life policy with regard to investment in R&D should be for a rapidly-growing, highly technological society.

Should it remain the same? Should it decrease, or should it increase? Now, this is a political judgment. I am asking you to put yourself in the place of, let's say, the Chairman of the Science Committee or the President.

How would you, just as a first cut, say that R&D investments ought to go in an industrialized, highly technological society that is experiencing real growth at the rate of 2.5 percent a year, or whatever it is we are getting at the present time?

Mr. BLUM. Do you want me to do that?

Mr. BROWN. Please. You are acting out the role of the Chairman of the Science Committee.

[Laughter.]

The CHAIRMAN. Do not get too comfortable with that.

[Laughter.]

Mr. BROWN. I am assuming that there will be a different Chairman next year.

[Laughter.]

Mr. BLUM. I am sorry, Mr. Brown. The Congressional Budget Office has been asked this question many times over the years, and we consistently reply with, "We do not make policy recommendations." I am afraid, therefore, I cannot respond.

Mr. BROWN. You are unwilling to do even a little modest role-playing?

[Laughter.]

Mr. BLUM. I am afraid so.

Mr. BROWN. Dr. Teich, you are not similarly constrained?

Dr. TEICH. No, we are not constrained in that way at all. Looking at the evidence of that branch of knowledge which you described as not a science, but still is the best we can do in economics——

Mr. BROWN. They tell me you were an economist.

Dr. TEICH. I am not an economist, I have never been an economist, and would not claim to be an economist.

Mr. BROWN. Okay.

Dr. TEICH. However, I do think that the economic evidence of past years suggests that investment in R&D is a very important component of economic growth.

I think it is also evident that our major international competitors are looking at their R&D enterprises and making efforts to increase those R&D enterprises over the coming years.

I have read, for example, that the Japanese, in the next seven years, as we are looking to reduce spending on R&D, would be—have indicated that they plan to increase—double government spending on R&D.

I have seen similar kinds of indications about other nations that are also economically advanced.

So I would, if I were in the position of the—in Mr. Walker's chair, do my best to increase spending in R&D over these coming years.

Mr. BROWN. When you say increase spending, you certainly want to put some limits? You are not totally profligate in this regard? [Laughter.]

Dr. TEICH. Well, do not make assumptions.

Mr. BROWN. Going above three percent of the GDP at this point would be a little more than necessary?

Dr. TEICH. I think the historic level has between—that seems to somehow—I mean, there is no science to establishing what percentage of GDP is the right percentage, but it would seem that something between 2.5 and three percent of GDP is a level that is, at least in historical experience, associated with strong economic growth.

Mr. BROWN. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Mr. Brown.

The Chair will now recognize members in the order that they appear to the Committee.

Mr. Weldon would be next.

Mr. DAVE WELDON [FLA]. I thank the Chairman.

Mr. Blum, I wanted to get a little more information on the mid-session review that was recently held.

Did OMB make adjustments to outyear projections at that mid-session review? As I understand it, they did.

Specifically, do you agree with those revisions, and would the CBO make the same kind of adjustments?

Mr. BLUM. The mid-session review made what I would characterize as relatively modest adjustments to the outyear projections.

They did update their economic assumptions for what actually has been happening to the economy since the time that the President's budget was prepared earlier in the year.

We have not done our own analysis of the President's mid-session review, but I would point out that in the review itself, they do present what they think the results of such a CBO analysis would show, in the sense of using our economic and other estimating assumptions that were employed for the Budget Resolution and looking at how the President's proposed budget would fit under that, all for the purpose of demonstrating that even under the more cautious assumptions of the Congressional Budget Office, the budget would reach balance by the year 2002.

But, mind you, the contingent policies would have to be invoked, and therefore the tax cuts that the President is supporting would not continue beyond the year 2000. And the level of discretionary spending would, in fact, be lower than the President would prefer.

Mr. DAVE WELDON of Florida. They did talk about the contingent reductions in the year 2001 and 2002 at that mid-session?

Mr. BLUM. Yes, they did.

Mr. DAVE WELDON of Florida. And those were reduced?

Mr. BLUM. They were revised upward in terms of the discretionary cuts. But at the same time, because their longer-term outlook for the year 2001 and 2002 was a bit better than what they had in the March budget, under their plan of how they would allocate what they called a fiscal dividend—if the deficit in the year

2000 was actually greatly below the level that we estimated would occur under the President's budget in May—they could allocate more money to discretionary spending. So their level of discretionary spending in the mid-session review in those two distant outyears actually increased somewhat.

They did not indicate how; they just put it into an allowance function and bumped up the discretionary spending a bit.

Since they bumped it up a bit, in order to come down to balance under our more conservative assumptions, the amount of the contingent reduction grew a bit.

I know this is terribly confusing, but that is the way it was laid out in the President's budget.

Mr. DAVE WELDON of Florida. I think I figured out what you just said.

Let me ask you a little bit more subjective question along these lines.

If we were to assume the President's priorities of education and environmental spending through the year 2002, does that not leave a relatively smaller pot of discretionary spending to absorb these contingency reductions that he is talking about? Specifically, you know, I think you are talking about $67 billion being absorbed by—a healthy chunk of it being absorbed by R&D.

Mr. BLUM. Well, we really do not know where that reduction would fall.

I mean, there is no glimmer in either the March budget or in the mid-session review as to how, if those contingencies came to pass, the lower discretionary spending would be allocated among individual programs.

You can, I suppose, make all the assumptions you like. You can do the kind of assumptions that the AAAS has done, but the fact of the matter is we just do not know.

Mr. DAVE WELDON of Florida. Thank you.

The CHAIRMAN. The time of the gentleman has expired. Mr. Ehlers?

Mr. EHLERS. Thank you, Mr. Chairman. First of all, I am going to thank you, Mr. Chairman, for calling this meeting.

I think it is extremely important that we air this subject.

Secondly, I thank the ranking member of the Committee, and associate myself with many of his remarks. I believe we certainly have to be very concerned about the decline in the spending for R&D, simply on the basis that I believe that the money we spend now will provide the base for the economic engine that is going to be in place three to five decades from now.

If we do not allocate the funds for research and development that we should, we are depriving our children and grandchildren of a major part of their income, just as seriously as we are now, through our budget deficits, depriving them of an opportunity for a vital economy three to five decades from now.

I put them in an equal category.

I think we do have to get to a balanced budget, but we also have to continue with our research and development effort to provide the economic base of the future.

The other comment I would make, Mr. Chairman—and I do not have a question for either panelist because I have been involved with one of them to some extent before.

But I do want to particularly thank Mr. Teich for his work, and thank the AAAS.

Every year they do an outstanding job of analyzing the budget as it relates to science, holding seminars on it, publicizing it for the scientific community, and dispersing the information.

It is probably the premier source to the scientific community of information regarding the budget and the projections and impacts.

I want to go on record as thanking both the American Association for the Advancement of Science and Mr. Teich, himself, for the good work they do in this, year after year after year, without a great deal of recognition or thanks.

So I want to thank you very much. I yield back the balance of my time.

The CHAIRMAN. Thank you, Mr. Ehlers. Mr. Olver?

Mr. OLVER. Thank you very much, Mr. Chairman.

Since there has been so much banter back and forth—and I do not know, Dr. Teich, what is your Doctorate in, since it seems not to have been in economics?

Dr. TEICH. It is in Political Science.

Mr. OLVER. Ah, Political Science.

That, of course, puts you in an exceptionally good position to be an objective viewer of what research and development ought to be, probably a good deal more objective than if that Doctorate were in the sciences itself, in the hard sciences itself.

Dr. TEICH. I should, however, admit that I did start out as a physicist. I have an undergraduate degree in physics.

[Laughter.]

Dr. TEICH. In the interests of full disclosure.

Mr. OLVER. Well, that is a good piece of disclosure. That certainly maybe takes away from the comment that I had just made.

[Laughter.]

Mr. OLVER. Anyway, in this discussion, it seems to me that this is truly Alice in Wonderland, what we are talking about here today.

You can look at the past and at least define—define and have settled numbers for what we are talking about if we look at the record.

When we look at projections into the future, it seems the comment of "we just do not know," which was not specifically related to the overall object of projections, but it seems to me that has a lot of truth to it, in the past, just last year's record alone shows that the Budget Resolution that finally passed here, and then what finally came out in the appropriations process even in one year, that the reality is quite different from what the suggestions were and what the projections were, which is what a Budget Resolution is in the first place.

And that is in the record of one year going backward.

Then you come to the present Fiscal Year, and you find that the Budget Resolution that we have that we are talking about that the Chairman speaks of as being extremely detailed, and he has praised it, compared with the President's budget just in the present year, the detail in the President's budget for the present Fiscal

Year for his proposals for the coming Fiscal Year, let's say, are enormously more detailed than are the Budget Resolution numbers.

Then we are starting to talk about what goes on out into five to seven years of distance, based on what we know in the past is a Budget Resolution and a reality quite divergent, and two different views and priorities in what we are talking about for the next Fiscal Year, and then we bring in contingencies, contingencies based upon what the economy is doing.

Well at the beginning of this Fiscal Year, the projection for the deficit for the Fiscal Year that we are in was something like $146 billion.

Then we heard it was somewhere down in the $130 billion.

And the most recent suggestions are that it may be down as low as $115 to $120 billion because the economy has been doing so well.

The economy has been doing remarkably well.

We have been growing since the recession in the 1991 and early 1992 period.

The job growth rate continues to be fairly good. That deficit projection now is down, I think, from what I heard the President say just a matter of a few days ago—and I am not sure whether that is the mid-term review or not—is down in the 115 and 120 range.

And yet we are talking about contingencies as if that is going to result in cuts in 2001 and 2002, whereas the President's projections into the future at least raise the possibility that these R&D areas, which at least Dr. Teich is willing to say investment in R&D is an important component of economic growth, and finally we got somewhere in the 2.5 to 3.0 rate is one that ought to be followed—his projections at least admit of the possibility of a set of increases down the road, depending upon how well the economy works.

So I must say the range in which the projections may be as one goes into those outyears is so large as to make it very difficult. Then you have to add—and I must say, I do not think there is a consensus.

If there is a question in what I am saying, maybe one or both of you might comment, though it appears that Mr. Blum is not in the business of making policy decisions—but I am wondering if there is any consensus out there as to whether Defense or civilian R&D produce a greater effect upon economic growth and job growth, which is what we would like to see; whether applied research versus basic research, because there is a large difference in the policies—the President's policies tend toward a recognition of the value of applied research and technical partnerships, technology partnerships and such, whereas the Chairman's point of view is that one really should be limiting ourselves to basic research. So I am asking whether a mix of applied or a tendency toward honoring applied research is more valuable toward economic growth, and then whether government versus private R&D has a greater effect upon the economic growth.

In those areas, if we had a consensus in those three areas, then we might begin to come back at least to reality in the present Fiscal Year, and maybe one Fiscal Year out, but with what numbers are there for what the past history is just one year away, seems to me, it is extremely risky to be talking about five and six years away, when, clearly, the economy is producing very different numbers.

So is there a consensus anywhere, Dr. Teich, about whether defense or civilian, whether applied research or basic research, whether government or private R&D, what are the relative impacts on economic growth in those areas?

The CHAIRMAN. The gentleman's time has expired.

[Laughter.]

The CHAIRMAN. But, Dr. Teich, you may give your answer.

Dr. TEICH. Defense R&D, the country undertakes Defense R&D in order to provide for its defense. The impacts of Defense R&D on the civilian economy are important, but they are in general secondary to the major purpose of those investments. I would have to say that——

Mr. OLVER. Which is not to say that they do not produce a lot of economic growth. I mean, surely defense R&D as it applied to say the Manhattan Project, to take a long, historical view backward, had much effect upon the growth of technology in the years following.

Dr. TEICH. Yes, of course. And one can cite other examples of important impacts on the civilian economy resulting from investments in defense R&D, but the major purpose of those investments in defense R&D is to provide for defense.

So if there is a consensus, it is I think that—and especially in recent years as defense technologies have become more specialized and have become more remote in many respects from civilian technologies, that the investment that—the received wisdom is that investment in civilian R&D will have the greater impact on investment——

Mr. OLVER. The greater—you are not going to put an actual numerical number, fine—the greater. Fine.

What about then applied versus basic?

Dr. TEICH. Well I do not think it is "versus."

First of all, I think that increasingly you cannot distinguish. The distinctions between "basic research" and "applied research" are not all that meaningful.

Mr. OLVER. A continuum——

Dr. TEICH. Yes.

Mr. OLVER. (continuing) —between basic research and applied research.

Dr. TEICH. Certainly.

Mr. OLVER. But you really cannot separate those out.

Dr. TEICH. It is not always productive to try and make those distinctions.

Mr. OLVER. Wonderful!

[Laughter.]

Mr. OLVER. How about private versus government?

Dr. TEICH. Clearly you need both. I do not think you can say private "versus" government. I think you need private and government.

Mr. OLVER. I am not really trying to say—okay——

Mr. EHLERS (Presiding). The gentleman's time has expired.

I would support your comment about continuum. In fact, I can make a good argument it should be a matrix rather than a one-dimensional continuum.

Mr. OLVER. All right, fine.

If you put all these in, then they really are a matrix, aren't they?

Mr. EHLERS. Yes. That is right.

Next in attendance was Mr. Roemer.

Mr. ROEMER. Thank you, Mr. Chairman.

Mr. Blum, you did not want to put yourself in the chair of a policymaker. I will not put you in that position, but I will ask you. How long have you been at CBO?

Mr. BLUM. For 21 years, since the beginning.

Mr. ROEMER. Twenty-one years. Okay. So you have a pretty detailed knowledge about how Presidents have worked or not worked with CBO in the past.

Did President Reagan agree to use CBO numbers in terms of a budget agreement with Congress?

Mr. BLUM. No, sir.

Mr. ROEMER. Did President Bush agree to use CBO numbers in terms of a budgetary agreement with Congress?

Mr. BLUM. Only with respect to certain scoring type issues, but not with respect to the overall——

Mr. ROEMER. An overall budgetary assumption. So President Clinton has agreed to work with Congress and use the CBO for the first time in your 21 years?

Mr. BLUM. That is correct.

Mr. ROEMER. Okay. Secondly I guess I would ask Dr. Teich a couple of questions.

First of all in terms of some of the differences that you have attached to your testimony between the President's projected budget and the Republican final budget resolution numbers. There seems to be a huge difference in terms of DOE spending.

The President is about 20 percent less in terms of cuts in DOE over the 7 years? Is that correct, Dr. Teich?

Dr. TEICH. That's right. The numbers in there suggest that.

Mr. ROEMER. So it is a 44 percent cut versus roughly about a 24 percent cut.

Dr. TEICH. Right.

Mr. ROEMER. Now you mentioned in your testimony that you thought the Japanese and maybe some other countries were going to double their expenditures on R&D in the next 10 years.

Is that correct?

Dr. TEICH. This is what has been reported.

Mr. ROEMER. Would you assume that to be true for other countries, as well, such as our major competitors, the Germans, other European countries, the emerging so-called "tiger countries"? Do you think that that is true?

Dr. TEICH. It is reported to be true of many of them, including Korea and Taiwan and South Korea and I think Germany and some of the other European Community nations.

Mr. ROEMER. So with this kind of a cut in the Department of Energy in terms of energy conservation, R&D, fossil energy R&D, clean coal technology, which are all completely eliminated, you think that this might really put us behind in terms of competition with other countries in a global environment in terms of the growth of our economy and in competition with other countries?

Dr. TEICH. I cannot speak specifically to those programs, but certainly if the other countries that you cite are increasing their R&D and we are reducing it, the implications of that seem fairly obvious.

Mr. ROEMER. Finally, I tend to agree with your assessment of other countries and information that we have heard from other countries such as the Japanese and the Germans.

They have long-term, 15 and 25 year plans to be involved very, very intimately in energy and environmental technology both in selling that to Third World countries and making a profit and working with their businesses and governments together in order to work with these Third World countries to reduce pollution, increase energy efficiencies, and so forth.

To your knowledge, do we have any kind of plan, let alone cuts in expenditures in these areas?

Dr. TEICH. I am not aware of what those plans are, but I think that that would be a question that ought to be addressed to the DOE witness in tomorrow's session of this hearing.

Mr. ROEMER. But based upon these budgetary numbers that you have outlined, you do not know—how could we ever implement any kind of plan based upon those kinds of cuts?

Would you think that we could do that, based upon these numbers?

Dr. TEICH. When there are differences as deep as seemed to be the case in energy R&D, it is certainly difficult for anyone to plan for the future.

Mr. ROEMER. I thank the witnesses and yield back the balance of my time.

Mr. EHLERS. The gentleman yields back the balance of his time. Next we have Ms. Jackson Lee.

Ms. JACKSON LEE. I thank the Chairman very much, and I think this is an important hearing. I have started off many of the Science Committee hearings with the concept that I think is very salient and relevant. That is, that science will be the work of the 21st Century, and it will be how we invest in it that will ultimately bring about the return for both our Nation and those young people who are looking for employment, particularly those who have not been exposed to math and science, and many of those who are my constituents in the 18th District of Texas.

Can I briefly ask both gentlemen to assess for me the Democratic and Republican budgets? Both seem to widen the gap with respect to GDP.

What would you consider to be an adequate level of federal investment in R&D in the outyears?

And, Mr. Chairman, I would like unanimous consent to submit a written statement for the record, and any other questions that I might have.

Mr. EHLERS. Without objection, so ordered.

Mr. Blum, would you care to answer?

Mr. BLUM. I am sorry. I do not think there is any objective basis to come up with the right answer. I mean, that is in essence a political choice that has to be made and that is the business of this Committee to make.

Ms. JACKSON LEE. Well, I respect your timidity, but if we cannot rely or secure information from experts, then how then are we going to be guided or have the right information to engage in a sensible debate?

If there is some disagreement with the Republican budget and the Democratic budget by way of the Administration, then may I secure your best guess?

Mr. BLUM. No. I think this is a line of questioning that is best addressed to my colleague at the table.

Ms. JACKSON LEE. You have no answer whatsoever as to what would be helpful to you in R&D research?

Mr. BLUM. No, I do not.

Ms. JACKSON LEE. Okay, could I have the next witness?

Dr. TEICH. Certainly.

Speaking as an individual and one who has watched the science budgets over many years, it seems to me that what I said before about R&D as a percentage of GDP, that we should be aiming for something between 2.5 and 3 percent as an investment level. And that is total, now, not just the Federal R&D, but that is private-sector R&D as well.

I cannot give you a specific number as to how we might achieve that, but I can assure you that we are not going to achieve it by reducing our R&D by 20 percent by the year 2002.

Ms. JACKSON LEE. So you are saying 2.5 to 3 percent of GDP?

Dr. TEICH. Would be a level to which we ought to aim. And what I am saying is that neither the President's plan nor the Congressional Budget Resolution takes us in that direction.

Ms. JACKSON LEE. How does that compare to the investment of countries like Japan and Germany in particular? Do you have any idea?

Dr. TEICH. They are in the—Japan is considerably above us in terms of civilian R&D as a percentage of GDP. Non-defense as a percentage of GDP.

In fact, I think——

Ms. JACKSON LEE. Non-defense? They are above us in non-defense R&D?

Dr. TEICH. As a percentage of GDP. In fact, I think most of our industrial competitors, major industrial competitors are in that measure, in non-defense R&D as a percentage of GDP.

Ms. JACKSON LEE. Would that be Germany, as well?

Dr. TEICH. I believe so. I would feel better if I had a copy of Science and Engineering Indicators in front of me to look up those tables, but I believe that is the case.

Ms. JACKSON LEE. Thank you, very much.

I yield back the balance of my time.

Mr. EHLERS. The gentlewoman yields back the balance of her time.

We now turn to Mr. Rohrabacher.

Mr. ROHRABACHER. I would just note, and is Mr. Roemer still here——

Mr. EHLERS. Sorry, Mr. Roemer has departed.

Mr. ROHRABACHER. Just a note that Mr. Clinton—correct me if I am wrong—but Mr. Clinton did not voluntarily use CBO figures.

It seems to me that certain Members of Congress—meaning the new Majority—had to force him to use CBO figures.

With that said, can you tell me what is the difference in our society between how much money is being spent on government-sponsored research versus private-sponsored research and development? Either witness.

Dr. TEICH. Currently I think out of a total R&D in this country which is about $170 billion, my recollection is that the private sector supports about 60 percent of that; and the government supports about 35 percent.

Mr. ROHRABACHER. Okay. Do those figures include the folks who were just out there on their own, individual inventors, entrepreneurs, rather than big business?

Dr. TEICH. If they report their numbers to NSF, it does.

Mr. ROHRABACHER. Okay.

Mr. BROWN. Would the gentleman yield to me just very briefly?

Mr. ROHRABACHER. Yes, sir, I certainly would.

Mr. BROWN. I think that Dr. Teich's figures are correct for the current time, but I wanted to point out that on a long-term basis there has been close to a 50-50 split between the public and private expenditures on R&D. And the situation right now with the cuts in the public R&D have tended to accentuate the importance of the private R&D.

Mr. ROHRABACHER. I see.

Mr. BROWN. And of course in Japan the situation is much more private than public. I think about 75 percent of Japan is private R&D.

Mr. ROHRABACHER. I thank the distinguished former Chairman.

In a situation where we do have a major percentage of the research and development coming from the private sector—and as the Chairman says, it is probably 50/50, would either of you like to suggest whether or not the federal or the governmentally directed research and development is more or less effective than the money that is spent in the private sector for research and development in terms of actually coming to a conclusion in finding new products and things that will actually better our lives, rather than just investigating theories?

Dr. TEICH. I think each has its very important purpose in the system. I think the Federal Government invests in areas in which the private sector is not likely to be willing to investment.

There is a lot more to that than just esoteric theories. There is the kind of things that the National Institutes of Health do. There is the kind of research that the National Science Foundation supports in materials, for example, or in computers.

There is the whole line of research that the Federal Government supported that led to the development of the Internet, for example.

So all of those things have impacts on people's lives, some sooner, some later.

The private sector supports the kind of research that is more directly and presumably on a shorter term going to lead to economic results. Obviously that is of particular importance for those firms that do those investments.

Mr. ROHRABACHER. And when you are dealing with a limited amount of dollars, it certainly seems to me that it would be important that we spend those dollars in a way that we can actually record and actually measure some sort of progress.

Indeed, there is a role for the government in those areas of basic research that are not leading directly to a measurable bit of progress. So I understand that. But someone has to do that basic research.

Let me just ask one last question—Is my time up?

Mr. EHLERS. You have approximately a minute remaining.

Mr. ROHRABACHER. Okay. Are there not other factors that we are talking about here, rather than simply government expenditures when you talk about our goal should be 2.5 to 3 percent of GNP for research?

Are we not also talking especially in terms of how much money the Federal Government should be allocating, are we not also talking about things like, for example, patent law?

As most people know, I am in the middle of a fight right now to secure that there is a guaranteed patent term which was taken away by this Administration two years ago, but it snuck language into GATT which eliminated the guaranteed patent term.

But do these things not also have an impact, whether or not you have a guaranteed patent term, or whether or not people can expect to receive a benefit from patients rather than simply the amount of money the government pours into research and development?

Dr. TEICH. Absolutely. Patent law has an impact on private-sector investment. Taxation has an impact. There are a lot of factors. Overall economic conditions have an impact, as well. So there are lots of factors that impact on private sector investment besides federal investment.

Mr. ROHRABACHER. Thank you very much.

Mr. EHLERS. The gentleman's time has expired.

We will next turn to Ms. Rivers.

Ms. RIVERS. No questions.

Mr. EHLERS. Ms. Rivers has no questions.

Mr. Gordon?

Mr. GORDON. No question.

Mr. EHLERS. No questions.

Mr. Luther?

Mr. LUTHER. No, thank you.

Mr. EHLERS. No questions.

I commend my colleagues.

[Laughter.]

Mr. EHLERS. Mr. Cramer?

Mr. CRAMER. I have no questions.

Mr. EHLERS. No questions.

I see no other Members here having questions. Unless anyone wishes to ask a second round, we have a few minutes yet.

Mr. BROWN. Mr. Chairman?

Mr. EHLERS. Yes, Mr. Brown.

Mr. BROWN. I want to just extend a little bit a point that I think the Chairman, Mr. Walker, had intended to pursue but perhaps did not get an opportunity to. That is, the question of priority within R&D.

I think that what Mr. Walker wanted to get at was whether in either case your analysis has gotten down to the fine level of distinguishing between what might be called basic research versus applied research or technology development.

I assume that the answer is, no, you did not get down to that fine level.

But, Dr. Teich, your analysis probably attempted to make some distinctions like that. Could you elaborate on that a little bit?

Dr. TEICH. Well, we did it only in the sense that you can sort of tease it out of the Agency budgets. So for example if you look at the treatment of the National Science Foundation and the National Institutes of Health in the two budgets, you get a sense of a good portion, I do not know, two-thirds, something like that, of the Federal basic research investment. So it is not a——

And if you look at the Department of Energy and the Department of Commerce, and particularly NIST, you get some sense of how the technology programs are going to fare even if you do not have a line-by-line analysis.

So my written testimony speaks to that, and the table indicates the percentage changes in those agencies and how they compare in the Congressional and the President's budget, bearing in mind the fact that we have made some assumptions to do our calculations of particularly the President's budget, and those assumptions may not be the correct ones.

Mr. BROWN. Is it your educated guess—do I understand you correctly?—that about two-thirds of the Federal R&D investments are what you might call basic research?

Dr. TEICH. No. That is not what I said. I said those two, the NSF and NIH, represent something like two-thirds of Federal basic research.

But in Federal R&D, the statistics that I am familiar with in the non-defense area, I think it is about roughly a little over one-third of non-defense R&D is basic research, or what is classified as basic research; and a similar portion is "applied,"; and the remainder is "development."

Mr. BROWN. How do you classify the NIH research?

Dr. TEICH. The largest part of NIH research is considered basic research. But they also do a significant amount of applied.

Mr. BROWN. I think the point that Mr. Walker wanted to make, and I certainly do not presume to speak for him, is that in the Republican budget a priority is given to basic research, and that the cuts, the reductions that have been made there are in the areas which he would describe as applied research.

As has been pointed out, it is a little hard to make these distinctions sometimes but for political purposes we can make any kind of distinction we want.

I think the effort will be made to show that the Congressional Budget R&D figures are more favorable to basic research.

Now this runs a little bit against the grain of what Mr. Rohrabacher was talking about which seemed to indicate that he would place greater emphasis upon that federally funded research which has some observable benefits to the public in the fairly near term. That is one way of describing "applied research," as I understand it.

Maybe I should ask Mr. Rohrabacher if he intended to convey that impression or not.

Mr. ROHRABACHER. The distinguished former chairman is quite accurate in pointing out the confusion in my exact position.

[Laughter.]

Mr. ROHRABACHER. I will have to admit that when I enter these hearings my absolute philosophy in these things are not totally in cement, and I am trying to learn some of these things. So the distinguished chairman is correct that I am not being totally consistent, but I am keeping an open mind.

Mr. BROWN. Well, I admire the gentleman very greatly because I am aware that he has kept an open mind, and I compliment him on that.

We gradually hope to educate him to a more sophisticated understanding——

[Laughter.]

Mr. BROWN. (continuing) —of the matrix similarities here and the lack of firm distinctions between these two areas.

I will not belabor this point, Mr. Chairman.

Mr. EHLERS. The gentleman yields back his time.

I would simply observe that most Democrats I have met are very eager to find open Republican minds that they can proceed to fill.

[Laughter.]

Mr. EHLERS. So with that, I want to thank the panel. You have done an outstanding job. We appreciate your work not only here but outside this Chamber, and we thank you for coming.

I do want to observe that this is a very important topic, and the unfortunate aspect has not received adequate mention not only as a Federal part of the R&D support going down, but also the industrial and commercial R&D numbers have been going down, contrary to what other nations are doing. That is the big concern I have.

I think both should be sufficient to provide an economic base for the future for this Nation.

Having said that, thank you to the panel. Thank you to the Members who appeared. And we declare the meeting adjourned.

[Whereupon, at 11:35 a.m., Tuesday, July 23, 1996, the Committee was adjourned, to reconvene at the call of the Chair.]

THE EFFECTS OF A SIX-YEAR BALANCED BUDGET ON CIVILIAN RESEARCH AND DEVELOPMENT—PART II

WEDNESDAY, JULY 24, 1996

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE,
Washington, DC

The Committee met at 10:14 a.m. in room 2318 of the Rayburn House Office Building, the Honorable Robert S. Walker, Chairman of the Committee, presiding.

Mr. SENSENBRENNER (Presiding). The Committee will be in order.

One of the things that people are relieved of when you have a temporary Chairman, who was walking down the hall and drafted to preside over this meeting, is the absence of an opening statement. So, without objection, we will put Mr. Walker's opening statement in the record at this time.

[The opening statement of Mr. Walker follows:]

OPENING STATEMENT

CHAIRMAN ROBERT S. WALKER

JULY 24, 1996

FULL COMMITTEE HEARING:

THE EFFECTS OF A SIX-YEAR BALANCED BUDGET ON CIVILIAN RESEARCH AND DEVELOPMENT, PART II

A number of people have questioned my motivation for calling this hearing. I believe this confusion can be best clarified by the words of one of today's witnesses. On May 8, 1996, Dr. Martha Krebs, Director of Energy Research at DOE, appeared before the Subcommittee on Energy and Environment and stated, "I do believe that I think that it is important for the Congress and the Administration to work together to give each other the correct messages about the value of programs such as are in the Office of Energy Research for the out-years." I share her concern and echo her call for giving each other correct messages about the out-years. The purpose of this hearing is to sort through the mixed messages coming out of the Administration.

A series of events led me to schedule this hearing. In May Dr. Krebs testified that the President's proposed reductions in energy research programs "were applied in a mechanical way and that they do not represent policy." Similarly, Dan Goldin, NASA Administrator, testified in the Senate and before our Space and Aeronautics Subcommittee that he has been assured by the Office of Management and Budget not to worry about the out-year numbers. This morning Senator Bond will be able to explain these statements further. Then, NSF Director Neal Lane repeated in a letter to me that "as the Administration has acknowledged, detailed program-by-program decisions had not been made at the time the budget was released."

All along, OMB has publicly maintained that the President did what Congress asked: developed a budget which achieves balance by 2002, as scored by the Congressional Budget Office. However, in April CBO determined that the President's budget relies on $67 billion in additional, unspecified cuts in discretionary spending in the last two years, beyond the specified, but now disavowed cuts in 1998 through 2002. Without these extra cuts, his budget leaves a deficit of $81 billion in 2002, but the Administration refuses to indicate where the reductions will be made.

This inconsistency between White House officials and agency heads concerns me. Should we believe the White House when they say the out-year numbers are real? If so, we must examine how NSF, NASA and DOE will absorb additional cuts in 2001 and 2002. Time and time again, the President has defined his priorities as education and the environment, so we must assume science programs could face further cuts in those years.

Yesterday, during Part I of this hearing, several Members expressed genuine concern for the future of R&D in this country and the need for long-term planning in order to remain competitive with other nations. I agree. If we are truly concerned about the future of science, we must be thoughtful in planning for the future.

Today I am pleased to welcome Senator Kit Bond. I appreciate that he has journeyed from the other body to contribute to our hearing. I would also like to welcome Dan Goldin, NASA Administrator; Neal Lane, Director of NSF; and Dr. Martha Krebs, Director of the Office of Energy Research of DOE. I thank you all for joining us, despite earlier postponements, and look forward to a useful hearing. It is my hope that we can sort through the conflicting claims made by agency heads and White House officials, so we can begin to examine the effects the real out-year numbers will have on civilian research and development.

Mr. SENSENBRENNER. And, if the gentleman from California has one, I recognize him for five minutes.

Mr. BROWN. Well, in an effort to fill this great vacuum that has been created, I will double the length of my opening statement.

[Laughter.]

Mr. BROWN. First, thank you very much for being here, Senator. You are as knowledgeable about the issues that we are dealing with here this morning as anyone that I can think of. And, we welcome your comments.

I also want to compliment you on the excellent job you've done with your own appropriations bill. I don't like to make invidious comparisons, but we feel that it's substantially better than the one that we passed over here.

And, we hope that when the two get together, the final product will continue to be better.

Going ahead with my prepared statement, I look forward to today's hearing which, in my view, will put the testimony from yesterday in a more useful context. As I pointed out yesterday, our general failure as a government to commit to a long term R&D budget that keeps pace with economic growth will inevitably lead to a loss of productivity.

Today, we will have an opportunity to see how this regrettable situation will affect some of the most important research agencies in government.

I recognize that the purpose of the hearing is to examine the credibility of the President's balanced budget versus the congressional budget resolution. I want to suggest a broader definition of "credibility." I suggest that the true test of credibility is whether either budget is economically sustainable.

And, I was even handed yesterday in condemning both of them for their long term impact on the American economy. That is, have we structured a budget that knows the difference between consumption and investment?

Does the budget process truly allow us to make rational choices between these budget needs? Most importantly, when we do reach a balanced budget, will that truly signify a healthier economic state or will we simply have achieved some artificial accounting, *Nirvana,* that, in fact, puts us on the brink of an irreversible decline in our national strength?

I want to acknowledge that yesterday's hearing was helpful in illuminating the intent of the Administration's trigger mechanism and how it may affect budget targets in the years 2001 and 2002. Essentially, this stems from the result of trying to accommodate two different scoring systems for the budget—the OMB scoring which used the more historically accurate economic predictors, and the CBO scoring which uses a more conservative set.

I do not believe there is any magic in either one. And, I do not believe there is any deceit in the Administration's inability to define exactly how they would make the transition beyond the year 2000 if the CBO economic forecasts are correct.

I think it is also necessary to point out, as Mr. Olver illustrated, this is something of an Alice in Wonderland debate. The whole issue of exactly what cuts are to be made in the outyears hinges on an assumption that all things will remain equal; that is, that we will have the same Administration, or a clone thereof, in the year 2002, that economic performance will be entirely predictable, that we will have the same Congress, the same balance within the world economy and so on. It's no wonder that agencies are unwilling to take precipitous actions today based upon such a set of assumptions.

And, I will close by stating again that this line of debate is not entirely constructive from my standpoint. The real issue of credibility lies not in how detailed we can make the accounting in the year 2002 but how well situated are we to continue a healthy economy.

And, I would just make a final point by saying I have been arguing with the President over his five year projections now for the last three years. And, I told him three years ago as far as NASA was concerned they were not sustainable, from my standpoint, and that I would not support them. And, I continue to take that same point of view.

Each year for the last five years, the five year outlook has changed dramatically. And, there is no subterfuge. There is no hypocrisy about it.

It's just that the changes were made to accommodate the current situation each year on a year-by-year basis. And, I did not like the priorities that they reflected. And, I continue not to like those.

Thank you very much for listening.

Mr. SENSENBRENNER. Without objection, other Members' opening statements will appear in the record at this point.

And, now I would like to introduce the Senior Senator from Missouri, the Honorable Kit Bond, for his statement. You are recognized.

STATEMENT OF SENATOR CHRISTOPHER S. BOND, UNITED STATES SENATE, STATE OF MISSOURI

Senator BOND. Thank you very much, Mr. Chairman and members of the committee. I appreciate the opportunity to testify before you today.

For the record, I am Chris Bond, Senior Senator for the State of Missouri.

As you may know, and as the gentleman from California was kind enough to mention, I have the honor and privilege to be the Chairman of a small, simple, non-controversial appropriations subcommittee, that of VA-HUD and Independent Agencies. Not only do we fund the Department of Veterans Affairs and the Department of Housing and Urban Development, but we also fund the EPA, NASA, the National Science Foundation and FEMA, not to mention a number of smaller agencies.

And, I am delighted that some of the agencies represented are here today to help us figure out how we can do the best with the plans that we have.

[The microphone is turned on for Senator Bond.]

Senator BOND. That will help. I doubt that anyone has missed what I have said, so I won't bother to repeat it.

As we all know, the President has professed his commitment to a balanced budget, and he has submitted a budget for seven years which makes large cuts—proposes and makes large cuts in appropriated spending in order to reach that balance, because he is choosing not to make what I think are absolutely essential reforms in entitlement programs that will drive spending for the federal government up in outyears to what I think personally is an unsustainable level.

Over the past several months, I have held a series of hearings in the subcommittee on the Senate side. And, I have been asking Administration officials how they are planning to handle the large outyear cuts proposed by the President's budget for the fiscal years 1998 to 2002.

And, I might say, since agreeing to come here today, I have heard the President propose more spending increases. And, indeed, the day that we went to markup, we had a whole range of new spending proposals from the White House.

All of these were paid for out of non-existent spending programs that we had not been able to fund and are not funded under the Budget Resolution. This causes us a great deal of problems.

And, it is, I think, appropriate, Mr. Chairman, that this committee look to the implications that this may have for the science and technology fields in which we must make an investment.

I want to be perfectly clear that this is not an "Alice in Wonderland" exercise but a very important planning tool, because what we appropriate this year has to be based on what we believe, to the best of our knowledge, will be available in future years. We have—if we are going to make real cuts in outyears, we have to make plans now for real changes in appropriations plans and they must be made now.

I've been asking this, because as one who has dealt with budgets and agencies for many years, I had the privilege of serving as Governor of Missouri for eight years, and I know, for example, that you cannot simply cut 25 percent out of the Veterans Administration medical care without having some plan in place to choose which hospitals to close, what operations to consolidate or how to switch to outpatient care. Nor can you make cuts of almost 18 percent in NASA over the next three years—and the members have a copy of that chart—without knowing now what plans you must make to cancel projects, eliminate research opportunities or dramatically scale back operations.

Let me deal with the Veterans Affairs side of it, because this is what brought the whole problem to our attention. The chart that is being put up is the Clinton budget presented by the President showing dramatic cuts beginning in 1998, almost a 25 percent reduction. And, that is part of the President's budget.

I asked Veterans Administration Secretary Jesse Brown, when he came before me, how they planned to handle that kind of reduction in their budget. Imagine my surprise when Secretary Brown told me that he had no plan and, in fact, he had no intent of creating a plan, because the cuts were not going to happen.

He told me that he had been assured by the President and by the Office of Management and Budget that those cuts were not going to happen, that they were going to negotiate each year.

Well, Mr. Chairman, the numbers in that budget which are necessary to get to a balance in 2002 show that VA medical care dropped from $17 billion to $13 billion over the next four years. If that were to be the case, then a quarter of the VA system would have to be shut down.

California, with 11 hospitals, would probably lose three. Florida, with six, would lose at least one, maybe two.

Illinois, with six, would lose one, if not two; Massachusetts, at least one; my home state of Missouri, one; New York, at least three and probably four; Ohio, at least one; Pennsylvania, at least two and probably three; and Texas at least two.

I believe that cuts of this size and dimension deserve some discussion. They have to be debated and they have to be understood.

For example, if California were actually required as part of the Administration's plan to shut down three facilities over the next three years, it certainly would not make sense to start building a new one during the exact same time. But, that is what the budget actually proposes.

As I said, the Secretary of VA has told me that these cuts aren't real, the President's budget isn't really the budget, that he would be shocked if it actually happened and that he could not operate under that scenario. That is why I believe it is a fair question as to why are the numbers in the budget if it's not the President's plan.

Now, I would say that the President's comments in his Memorial Day radio show seemed to be geared along the same lines as he stated about his budget proposal, which would shut down one-quarter of the VA medical system, hospitals, clinics and nursing homes at a time when the veteran population is rapidly aging and in need of services. He said, "Even as we balance our budget, my administration is working to keep our solemn commitment to America's veterans by improving the health care they receive."

So, I think a fair question is which set of books are we using.

Now, I thought in our subcommittee that perhaps it was just the VA. Maybe they were confused or maybe they thought the best way to avoid the potential political consequences of calling VA medical care unnecessary or low priority was to tell veterans, "Don't worry. While a $13 billion cut is in the budget, it won't really happen."

So, then I had an opportunity to ask the distinguished Administrator of NASA, Dan Goldin, who is here with us today, about the outyear cuts he would be facing. These are in the charts that have been presented for all members.

And, I asked him about the plan to handle it. I was dismayed, but by this time not shocked, when he told me that OMB had instructed NASA to take no actions to plan for the outyear cuts. In essence, the White House had instructed them not to plan for those cuts.

But, Mr. Chairman, the President's budget for NASA shows a decline from $13.9 billion from the current fiscal year 1996 to $11.6 billion in FY 2000; and, then depending upon the trigger—and if you will show that trigger cuts, depending upon the trigger, the numbers could fall further.The proposed 17 percent reduction over the next several years, if it were to occur, would mean that one of the major programs or spending areas of NASA would have to go.

We would either have to get rid of the Space Station or get rid of the Shuttle program or get rid of Mission to Planet Earth or close the seven field operations. As far as I can tell, you have to pick one of the four.

That's the only way you could cut spending from $13.8 to $11.4 billion in 2002. Again, the Administration tells us we should not worry about that, we should ignore that problem and hope it will go away, which brings me back to the key question of why it matters.

We ask these questions, Mr. Chairman, of Administration officials because we have been told that there will be a balanced budget. However, instead of admitting that these tough cuts are necessary in order to spend more on other programs—and they are multiplying—again, today there was a major initiative for spending on drugs for AIDS—the $13 billion taken from the Veterans goes a long way to funding other priorities.

That's why I'm wondering which set of books, which of the two sets of books, are actually being used. One set, the President talks about when he wants to say he has a balanced budget. The other is when he wants to tell people that he is protecting priorities or not causing political pain.

And, the President seems effortlessly to shift back and forth between two sets of books. In one speech, he's the tough budget cutter. In the next speech, he's the mainstream protector against extremists who are cutting or gutting favored programs.

I wrote several letters, along with my colleagues on the Budget Committee, to OMB Director Rivlin asking for clarification and details. We have written to agencies, other agencies, asking them what actions they plan for the outyear cuts—the FDA, the FAA, the Undersecretary of Agriculture for School Lunch and WIC and the Federal Highway program.

And, I've asked EPA Administrator Browner and Secretary of HHS, Shalala in open hearings what their plans for handling the reductions would be. The response, disturbing but predictable. So far, I've found no one who is going to be cut.

Administrator Browner told me EPA was a priority, and she was absolutely sure that the EPA would not face a 10 percent cut in 2001. That's what cut is triggered to achieve the balance. As you can see on that chart, that red line, that's what CBO says would have to occur in 2001, and an additional 18 percent in 2002.

Secretary Shalala told me that NIH, Indian Health Services, HCFA administrative costs, Head Start and Ryan White AIDS program would not be cut. And, there may be others as well.

And, so, Mr. Chairman, my problem is that if no one is being cut, how is the budget going to be balanced?

As illuminating as the Administration officials' testimony has been, equally interesting was the Administration's response. According to an Associated Press article, dated June 10, 1996, when challenged, OMB officials said, "But conceding that the comments were politically awkward, another official said privately that Brown and Goldin would be talked to."

Mr. Chairman, "talked to" about what? About telling the truth about what they were told by OMB, that there was no intention of balancing the budget? That the budget is a sham? Talked to about the fact that they might have blown it by exposing a second set of books?

That's why I asked some questions to OMB Director Rivlin, and I never got an answer. Where will those $67 billion in additional discretionary cuts fall?

Are there programs exempt from the cuts, as claimed—education, environment, law enforcement, VA?

Are the numbers in the budget which showed 25 percent cuts before the trigger comes in for VA real? Or, is Secretary Brown wrong in his claim that the President assured him that the cuts would not happen?

This is a question of accountability. A cabinet secretary and an agency head have apparently let the cat out of the bag. And, for being candid, they are being "talked to."

As David Broder said in an article which appeared in "The Washington Post" on June 10, 1996, "Clinton is telling not just the constituents of the endangered programs but their managers that they will have plenty of opportunities in future years to stave off the cuts. That may not be cheating, as Rivlin says, but is playing a game that is too clever by half. Balancing the budget means making tough choices. Clinton is postponing those choices and by giving people the sense that the goal can be reached without giving up anything that is important making it that much harder when the crunch comes."

And, that, Mr. Chairman, is your challenge and our challenge, because we have a budget within which we have to live. We are going to have to achieve balance one way or the other. And, we need to find out what these budget cuts mean for the future of our investment in science and technology.

[The prepared statement of Senator Bond follows:]

TWO SETS OF BOOKS?

Statement Senator Bond
House Science Committee
July 24, 1996

Mr. Chairman, members of the Committee, thank you for this opportunity to testify before you today.

As you may know, I have the honor and priviledge to be the Chairman of an small, simple, noncontroversial Appropriations Subcommittee -- VA-HUD and Independent Agencies. Not only do we fund the Department of Veterans Affairs and the Department of Housing and Urban Development, but we also fund the EPA, NASA, the National Science Foundation and FEMA not to mention a number of smaller agencies.

Now over the past several months I have held a series of hearings in the SubCommittee, and I have been asking Administration officials how they are planning to handle the large outyear cuts proposed by the President's budget for the fiscal years 1998 -2002.

I have been asking, because as one who has dealt with budgets and agencies for years -- I know for example that you cannot simply cut 25% out of VA medical care without having some plan in place to close hospitals, consolidate operations, or switch to outpatient care.

Nor can you make 18% cuts in NASA over the next three years without a plan to cancel projects; eliminate research opportunities and dramatically scale back operations.

So I asked VA Secretary Brown what plan they had to accomplish the 25% reduction in VA medical care as proposed by the President.

Imagine then my surprise when Secretary Brown told me they had no plan. And that in fact, they had no intent of creating a plan -- because the cuts were not going to happen!

Mr. Chairman, the numbers in the President's budget show that VA medical care drops from $17 billion to $13 billion over the next 4 years. This would mean that a quarter of the VA system would have to shut down:

California with 11 hospitals would probably lose 3;
Florida with 6 would lose at least one, maybe 2;
Illinois with 6 would also lose 1 if not 2;
Massachusetts at least 1;
Missouri at least 1;
New York at least 3 probably 4;
Ohio at least 1;
Pennsylvania at least 2 probably 3;
Texas at least 2;

I believe that cuts of this size and dimension deserve discussion, debate and understanding. For example, If California were actually required as part of the Administration's plan to shut down three facilities over the next three years -- it certainly doesn't make sense to start building a new one during the exact same time. But that is what the Clinton budget actually proposes.

However, the VA Secretary tells me that those aren't real -- that the President's budget isn't really his budget. That he would be "shocked" if it actually happened and that they "cannot operate under the scenario".

That is why I believe it is such a fair question as to why are the numbers in the budget, if it is not the President's plan?

The President's comments in his Memorial Day radio show seemed to be geared along these same lines as he stated about his budget proposal -- which would shut down one-quarter of the VA medical care system, hospitals, clinics and nursing homes at a time when the veteran population is rapidly aging and in need of the services --

> "Even as we balance our budget, my administration is working to keep our solemn commitment to America's veterans by improving the health care they receive,"

So a fair question remain who's budget is it?

Now I thought perhaps it was just the VA. Maybe they were confused, or maybe they thought the best way to avoid the potential political consequences of calling VA medical care "unecessary" or "low priority" was to confuse veterans by saying "Don't worry, while a $13 billion cut is in my budget, it won't really happen."

So I asked the NASA Administrator Dan Goldin about the outyear cuts he would be facing, and what his plan was to handle them. Much to my amazement he too told me that he had been told by OMB not to worry about the outyear cuts. That he had been "instructed" by the White House to take no action.

The President's budget for NASA shows a decline from the $13.9 billion from the current FY96 to $11.6 billion in FY2000; and then depending on the trigger, these numbers could fall further. This proposed 17% reduction over the next several years means that one of the major programs of NASA would have to go -- The Space Station; the Shuttle Program; Mission to Planet Earth or the 7 field operations approach.

Again, if this is the course the Clinton Administration wants us to go, we should debate it -- not ignore it and hope it will go away.

Which brings me to the key question of why all this actually matters.

As you all know, the cuts I was asking Administration officials about are those which the President needs in order to claim that he has proposed a real balanced budget.

However, instead of admitting that these tough cuts are necessary in order to spend more on other programs -- the $13 billion from the Veterans goes a long way toward funding other "priorities" -- the Administration instead wants to have it both ways books. That is why I believe they are actually keeping two sets of books.

One set is what the President talks about whenever he wants to say he's got a balanced budget -- the other whenever he wants to tell people how he is protecting priorities, or not causing any political pain.

Effortlessly the President shifts back and forth between the two sets of books -- in one speech he's the tough budget cutter; in the next speech he is the mainstream protector against the extremist who are cutting or gutting favored programs.

What I have been trying to find out is which set is the real one?

That is why I, along with several of my colleagues on the Budget Committee wrote a series of letters to then OMB Director Rivlin asking for clarification and details. We have also written to several agencies asking them what actions they are taking to plan for the outyear cuts -- the FDA, the Federal Aviation Administration, the Undersecretary of Agriculture responsible for the School Lunch and WIC progam and the Federal Highway Administration.

And I have asked EPA Administrator Browner and HHS Secretary Shalala in open hearings about what their plans for handling the reductions would be.

The response is disturbing, but predictable. So far -- no one is getting cut.

Administrator Browner told me EPA was a "priority" and she was "absolutely" sure that EPA would not face a 10% cut in 2001 and an additional 18% in 2002 caused by the outyear trigger.

Secretary Shalala told me that NIH; Indian Health Services; HCFA Administrative costs; Head Start and Ryan White AIDS program would not be cut, and that there may be others as well.

So if no one is being cut ... How is the budget is getting balanced?

Mr. Chairman, as illuminating as the Administration officials testimony has been, equally interesting was the Administration's response. According to an Associated Press article dated June 10, 1996:

> "But conceding that the comments were politically awkward, another official said privately that Brown and Goldin would be talked to."

Mr. Chairman, "Talked to" about what? About telling the truth -- that the Administration has no intention of a balancing the budget? That their budget is a sham? Talked to about how they blew it by exposing the second set of books to the light of day?

What does that say about this Administration?

That is why I have said I want honest answers to the questions we posed to OMB Director Rivlin and never got an answer to:

- Where will the $67 billion in triggered cuts fall?

- Are certain programs exempt from the cuts as claimed? Education, environment, law enforcement?

- Are the numbers in their budget real for the VA? Is Secretary Brown wrong, or right in his claim that the President assured him the cuts proposed would not happen? And if the VA numbers are not true, what else in the President's budget should we disbelieve?

Too often in Washington no one is accountable -- but this issue, is too important to be treated as if it was business as usual.

A cabinet secretary and an Agency head have apparently let the cat out of the bag. And for their candor, they are going to be "talked to". But the authors of the scam aren't being "talked to".

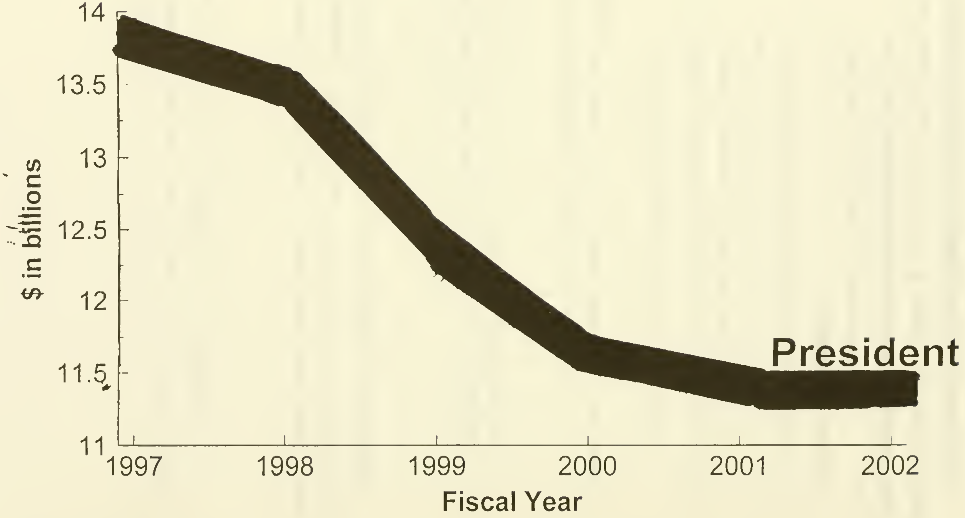
The creators of the two sets of books strategy to fool the public aren't being "talked to". Those Administration officials who keep playing the "Clinton Budget Game" described by David Broder aren't being "talked to".

Only those two officials who happened to tell Congress and the public what is actually going on -- they are the one's to blame according to this Administration.

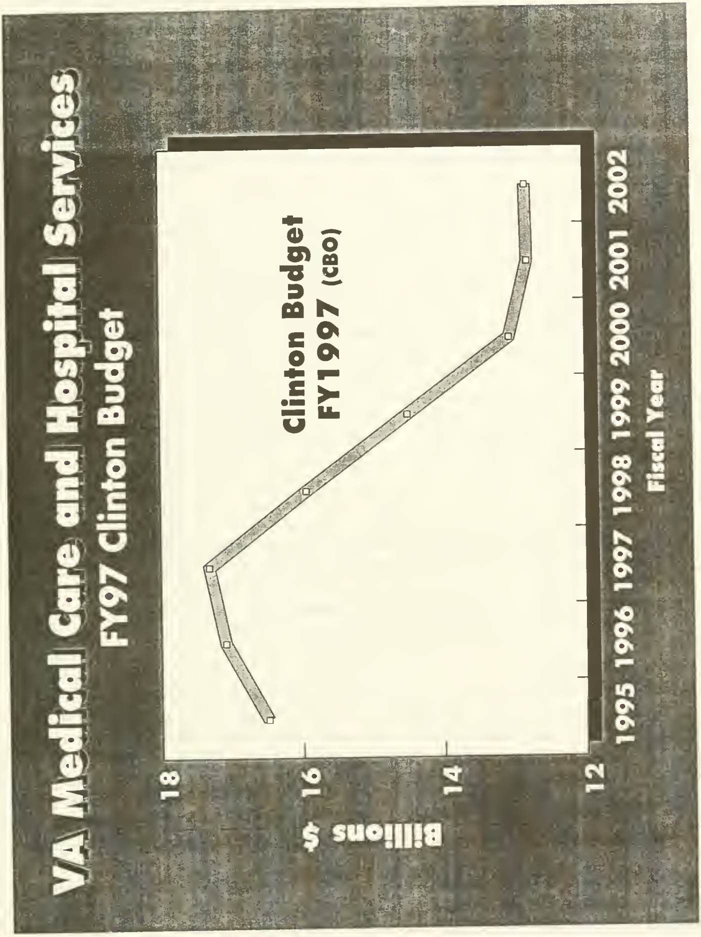
That is wrong. And until answers are provided to the basic simple question of which set of books is the real one, I will continue, and I hope this Commitee will join me, in pursuing the truth.

Thank you Mr. Chairman.

NASA



Note: A discretionary trigger reduction of $1.3 billion in 2001 and $2.4 billion in 2002 is assumed for the President's request.
Source: Senate Budget Committee Majority Staff.



VA Medical Care and Hospital Services

FY97 Clinton Budget

The CHAIRMAN. Thank you, Senator Bond. First of all, let me welcome you and apologize to you and to the others here for getting stuck in a Republican conference that turned into rather an interesting session. And, I was forced to remain there for a few minutes.

I do like to start these things on time. And, I appreciate everybody else being here and apologize for my not being here.

And, I thank you for your excellent testimony. You sum up some of the concerns that I think we've had as these reports have come forward that the numbers don't seem to match the reality of what the plans are.

Would you agree with me that in order to achieve the balanced budget that we have been seeking now, both the Congress and the Administration, that it's necessary to do the outyear planning?

Senator BOND. Mr. Chairman, I've served as the chief budget officer of the State of Missouri as Governor, and you cannot make plans for long term spending, particularly on programs which are multi-year without knowing where you are going, without making plans now. As I indicated, if we are going to see this kind of draconian cut in NASA, we had best determine now which one of the four areas is going to get the axe and stop spending money on it.

If we are going to shut down all the field operations, we had better shut them down now. Or, if we are going to shut down one of the three major programs, we ought not to be investing in it now. It's very simple.

The CHAIRMAN. Well, it seems to me that also that one of the things that got us into the problem that we are in, in terms of Congress and the Administration, is that we have tended to lurch from year to year, that everybody got by each appropriations process, wiped their brow and said, "Whew, we made it again another year." And, so that we went through exercises, in all honesty, like we are going through in the House at this moment where we are adding spending back in and increasing programs that we thought were on a downward trend.

It's very hard for me to see how you get to a balanced budget if, in fact, what you do is continue to spend and if you only look at these things one year at a time. And, the attempt that we made with regard to the science program was to say, "Let's set some priorities and make certain that we live within that."

It sounds to me like that's what you are saying, too; is if you are going to live within a seven year balanced budget plan, you have got to properly prioritize in order to assure that after seven years you have done the right things the right way.

Senator BOND. Well, the subcommittee which I chair is probably the best example of that. We faced a catastrophe because of prior commitments for Section 8 assisted housing programs.

These are wonderful programs, but when you begin adding them on you add outyear costs. And, more and more of our budget is consumed by the commitments made in prior years.

And, if we do not do something about it in this cycle —and I'm going to ask my colleagues on the House to join me in taking what is going to be some very difficult medicine. It's going to be very bitter medicine, because we have to make some changes this year so that we will be able to live within a reasonable budget for the HUD activities, assisted housing, in future years.

If we don't start taking those difficult steps now, the projected costs go out the roof in a very short year, quadrupling.

The CHAIRMAN. And, I assume that your concern, as a chairman of a subcommittee there that has NASA in its jurisdiction, that has VA in its jurisdiction, that has NSF in its jurisdiction and so on, is the fact that——

Senator BOND. EPA.

The CHAIRMAN. EPA, is the fact that if all of them are coming to you and saying that, "We are not going to be affected in the outyears," it's very hard for you to see how in the world you are going to live within any kind of 602 caps that would be relevant to this kind of a budget cut.

Is that correct?

Senator BOND. It's not possible.

The CHAIRMAN. That's—and that's my concern. And, if we don't set the right kind of priorities, how in the world can we argue for some of these programs that many of us, including the ranking member, Mr. Brown, thinks, you know, are absolutely essential to the nation's future?

We don't see how you have a strong economy without making the investments in R&D, which are necessary. And, your subcommittee handles some of the major areas of that kind of investment, and they will all be squeezed out if we haven't appropriately prioritized.

Well, I thank you very much for your testimony. It has been very helpful.

Mr. Brown?

Mr. BROWN. Thank you, Mr. Chairman. Senator, I admire your record and your statement a great deal. I think I agree with about 90 percent of it.

But, I have some problems with how we deal with uncertainty. And, I think you would agree that there is uncertainty in the future.

Senator BOND. Of course. I think even Yogi Berra explained that.

Mr. BROWN. For example, there's a little difference between the President's version of what we should spend on defense over the next seven years and what the Republican budget resolution calls for. It's a matter of $10 billion or $12 billion a year, as a matter of fact.

There is the question of whether we make a major tax cut now or whether we wait until the budget is balanced. Those matters have not been resolved completely yet, have they?

Senator BOND. I think with respect to the President's budget, the significant cuts in defense were proposed in the near term years. And, he proposed to raise that spending later.

The congressional budget resolution does not concur with that. The congressional budget resolution was prepared knowing that even under the best of circumstances a budget is just the best projection of where we think now we would go in the future.

Mr. BROWN. Right.

Senator BOND. And, as difficult as the congressional budget was—and I took part in that, didn't always agree with it, but at least it was our best judgment. And, we made all of the committees, at least, follow that current assumption. We have to work on the basis of a common assumption.

Mr. BROWN. Senator, I couldn't agree with you more. And, I'm not quarreling with the need to do that.

There is no one in the Congress that I know of who has devoted more attention to the need for good, long range, economic planning for the benefit of the country and to make budgets that recognize realities.

Let me ask you one question to see—to get your opinion on something that is quite controversial over here. Your own Senate bill provided a balanced set of priorities and does not attempt to terminate major programs now because of potential problems in the outyears.

Do you think that the uncertainty in the outyears is sufficient, for example, to terminate NASA's Mission to Planet Earth today?

Senator BOND. Under the assumptions in the congressional budget that we adopted, I do not believe that NASA should, could or must take the cuts projected in the President's budget. I think that those cuts are unnecessarily severe.

I believe, as I think I indicated in my opening statement, that entitlement reform is the most important area we should deal with to make sure that our available dollars for appropriated accounts are not squeezed out in future years.

Mr. BROWN. I could not agree with you more. And, we haven't faced up to that problem. That's one of the uncertainties, whether on our side we will have the will power to make the necessary changes in the entitlement programs.

And, I think that the Republican position is forcing that decision to be made. And, I think that's one of the constructive results that are coming forth.

But, I am trying to identify the difference between dealing with uncertainty and what some people might call duplicity. You were Governor at the time a former great President was elected on a pledge to balance the budget and who proceeded to cut taxes by 25 percent with the aid and abetment of all the Democrats who liked to cut taxes, too.

That President projected that the budget would balance under those conditions, because he adopted certain economic assumptions about stimulation and so forth. Would you say he was duplicitous because he made the wrong economic assumptions?

Senator BOND. I do not know of any instance in which you could charge specifically that he was contending two different things at the same time.

And, let me go back to one of your first comments about the bipartisan support. As you well know, there are very strong leaders in our body on the Democratic side like Senator Kerrey of Nebraska, who have been great champions of entitlement reform. So, this is something that we must work together, Democrat and Republican.

I do not know of, and I have not experienced in my time in government, an instance in which a president or other budget maker has said that we will take, for example, the scoring of an independent agency—and President Clinton told us in 1993 that the Congressional Budget Office would be the scorekeeper and everybody had to play by that scorekeeper's rules. I have never seen a time when a budget was presented which offered the accomplishment of balancing the budget on the one hand by that CBO scoring and at the same time the chief budget officer, in this case the chief executive, has told agencies that we absolutely will not make those cuts that are shown in the budget.

That's what I view as duplicitous, to tell people we are going to balance the budget on the one hand but for all of you who would be affected, we are not going to cut you. That is where I find duplicity.

The CHAIRMAN. The time of the gentleman has expired.

I am sensitive to the Senator's time. And, we have a vote that is about to occur.

And, as I understand it, it's going to be back-to-back votes. So, we will be gone probably at least a half an hour.

Are there other members—Mr. Luther would be next. Do you wish to ask questions at this time, Mr. Luther?

Mr. LUTHER. No, Mr. Chairman. I have no questions.

The CHAIRMAN. Okay. Mr. Roemer?

Mr. ROEMER. I just have a brief question for the Senator.

The CHAIRMAN. If the gentleman would proceed.

Mr. ROEMER. Thank you, Mr. Chairman. First of all, Senator, thank you for taking time out of your busy schedule to come over to the House and testify to our committee.

I am not the biggest defender of the President, but I certainly want to be fair to the President. Yesterday, we had a witness from CBO come up here, and he had been with CBO and still is. His history goes back 21 years.

And, I asked him, Mr. Blum, had any other President, President Reagan, President Bush, ever decided to use CBO figures for a basis for a budget agreement. He said never before in the history of CBO has any President agreed to use that as the basis for an agreement with Congress.

So, I think that, you know, he's—I don't think the President is cooking the books. I think he is trying to come up with a way to get to a balanced budget.

I don't necessarily agree with every decision he has made. Certainly, I don't agree with what the House Republicans have tried to cut.

You have quoted Mr. Broder's article a couple of times in your statement. And, let me just say at the end of it, I couldn't agree more with what Mr. Broder says.

He says, "Balancing the budget means making tough choices. Clinton is postponing these choices by giving the people the sense that the goal can be reached without giving up anything that is important." And, it goes on to conclude.

I would say that we have to make those tough choices in Congress as well, Senator. And, one of the ones I'm willing to make is to cut the Space Station out of the NASA budget.

I don't know how you can continue to jam that kind of inefficient project into a budget. It's like putting in a 16 ounce Texas steak into a sardine can with the way the budget is coming down, both under the Republican budget resolution and the President's budget, and not hurt a host of the other good programs in NASA.

I think we do have to give up some important things. But, I think we have to measure what is important, what is efficient what based on its track and history and record is something that is worthy of taxpayers' expenditure.

I would argue that the Space Station is not one of those projects. I think we have to make those tough choices.

Do you have any suggestions to our committee as to what kinds of tough choices we can make under the jurisdiction of our budget here and your budget?

What can we cut? How can we make those tough choices?

Senator BOND. Well, I fought very hard and worked on the process by which a congressional budget resolution was adopted. That budget resolution, the first one which was adopted last year and the one which was adopted this year, both show under CBO scoring, which the President, as you point out, had chosen to be the independent scorekeeper, that the deficit will reach zero in 2002.

I think that is important. I think getting a budget deficit to zero in a definable, identifiable time is very important for the continued economic and social health of our country.

Mr. ROEMER. And, you agree——

Senator BOND. Having done that, I think that the budget that has been adopted, was adopted last year by Congress, the Reconciliation Bill, which was vetoed, it would have balanced the budget, the budget that has been presented and adopted by both houses of Congress is the plan which we should pursue.

I disagree with you on the Space Station. I think it has tremendously important scientific and technological potential. That, of course, is the subject which your committee and our committee is going to debate.

But, the question I am concerned about here is which set of figures we need to use to make the—to establish the framework to make those decisions. And, I don't believe that this is—the President's plan is workable for NASA.

And, from what I've heard, I do not believe he means to follow that plan.

Mr. ROEMER. But, how would we differ from him? If you are saying he is not willing to make the tough choices and give up something important, what are you willing to give up?

What are you willing to give up?

Senator BOND. I voted for the Balanced Budget Act of 1995, which made those tough choices. So did a majority of my colleagues in this body and the other body.

The President chose not to agree with it. He vetoed it. Those were tough choices.

The common wisdom when I came to Washington—and Washington common wisdom, I realize, is an oxymoron—was that no party would come forward with a balanced budget plan, because there was too much pain. I think we showed that to be wrong.

And, the other part of the common wisdom was that everybody would fall in and work together to make adjustments and assure that the best result could be achieved if that difficult political risk was taken. Unfortunately, that part of the common wisdom also was wrong.

The CHAIRMAN. The time of the gentleman has expired.

Senator Bond, we thank you very much for being with us and for your testimony. And, I appreciate very much your taking your time to come and appear before us today and give us the benefit of the study that you've done on this topic.

Thank you.

Senator BOND. Mr. Chairman, thank you very much. We look forward to continuing to work with you and this committee.

We will miss the opportunity to work with you. But, we appreciate the chance for a dialogue. And, we will continue it, I'm afraid, at probably too great a length in the coming weeks on VA/HUD.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you. With that, the committee will stand in recess. We will get back as quickly as possible to take our next set of witnesses.

[Whereupon, a recess is taken at 10:50 a.m., to reconvene at 11:18 a.m., this same date.]

AFTER RECESS

The CHAIRMAN. The hearing will come to order.

We would ask our witnesses to go to the table. As is practice with the committee, I would ask unanimous consent that the full text of your prepared remarks be made a part of the record.

And, if you would summarize your remarks in about five minutes, it would allow us then to go to questions. I expect other Members will be coming back from the floor.

And, Mr. Goldin, we will begin with you.

STATEMENT OF DANIEL S. GOLDIN, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. GOLDIN. Thank you, Mr. Chairman. Mr. Chairman, members of the committee, I am very pleased to have the opportunity to come before you today.

I want to start off by saying that I am proud of the direction we are going in at NASA. Budget cuts have forced us to become more efficient. They have forced us to reevaluate what we do and how we do it.

Our budget projections have been cut 35 percent over the last five years. And, we've still, under the 35 percent cut, have managed to start over 30 new programs.

These are high quality, research intensive programs that reflect a new focus at NASA. They are not operational in nature or bureaucratic in nature.

We are doing more for less, which is exactly what America wants us to do. I am proud of the way NASA has stepped up to this.

NASA totally supports President Clinton's commitment and Congress' commitment to balance the budget. The budget numbers are real. The discretionary caps are real.

Let me assure you that we, at NASA, are taking them very seriously. Any increase for NASA would have to come at another domestic program's budget—out of another domestic program's budget.

We are going to have to prove to the Administration and to you and to the American people that we deserve this additional funding. We are going to have to justify our programs on the basis of merit.

That's how it should be. This is peer review.

I instituted our own internal peer review at NASA, and I believe in the same approach across domestic spending. It's healthy.

It's good for individual agencies. It's good for government.

It's good for the country. It's different, so we are concerned about it.

NASA should be forced to show why our programs are relevant and well managed. All departments and agencies should be able to show why their programs are relevant and well managed.

If we can't show that our programs are well managed and important to America today or in the future, why are we doing them?

Let me address the outyear question up front. The President is committed to reviewing spending priorities on a year-by-year basis just like the Congress.

I don't believe it makes sense to cut programs back now based on anticipated problems. If we had taken that advice just two to three years ago, NASA science programs would have been devastated.

In fact, where appropriate, we will ask for new starts, as we have done and intend to do in the future. We know that the times are tight and the new budget reality is truly a reality.

But, we also know that NASA has a good case to make. Our research and development is critical to America's future competitiveness, scientific preeminence and global edge.

OMB expects us to come in and fight for a level of funding that supports NASA missions. OMB will not be disappointed. That's precisely what we will be doing.

In order to meet our commitment to existing budget agreements, we must continue to look for more reductions in places where it makes sense. I don't believe we have taken all the reductions in some programs that we can. We owe this look to the American taxpayers.

Complacency in management in today's world is unacceptable. Sometimes, we give the government a little bit more room than the private sector.

Looking for ways to become more efficient and pare down programs and bureaucracies make some people uncomfortable. Some of those among our contractors, the aerospace industry, our employees and our constituents, may not understand the reasons we are making these changes.

I hope in the future we will be able to bring everyone on board to the concept that government must continue to search for efficiencies and return them to the American people in more relevant science and a balanced budget. But, can we give America less?

Can we give them anything less than good management and relevance?

This is our commitment at NASA. We are transforming the agency to make it happen.

Let me close by thanking you for the opportunity to be here and for making research and development the priority. We look forward to working with you to make sure that America continues to invest in the R&D that is so essential to the country's future.

Thank you.

[The prepared statement of Mr. Goldin follows:]

Statement of

Daniel S. Goldin
Administrator
National Aeronautics and Space Administration

before the

Committee on Science
House of Representatives

Mr. Chairman and Members of the Committee:

I am pleased to be here today to present the views of NASA at this hearing concerning future funding for civilian research and development (R&D). When I appeared before the Committee to present NASA's FY 1997 budget request, I discussed with you the Administration's views of the post-1997 budget runout numbers for NASA's programs. The key point, then and now, is that the Administration is committed to maintaining an effective and balanced budget for NASA. Instead of viewing the outyear budget projections as hard and fast policy guidance, and worrying about their consequences, I recommended we focus our attention on the strong statement made by the President in his request for NASA in FY 1997.

Like other Federal agencies engaged in R&D, NASA is an agency whose R&D programs squarely address the future. The returns in scientific discoveries and technology innovations we currently enjoy, for example, from the Hubble Space Telescope or the Advanced Subsonics Technology programs are due to investments made in past years. We have enjoyed tremendous support from past Administrations and Congresses which have enabled these present-day discoveries. The development programs NASA is pursuing today, whether it be the International Space Station or the Earth Observing System or the new generation of science instruments for the Hubble Space Telescope, are important elements in this Administration's strategic goals for science and technology investments.

Within NASA, we are hard at work developing the recommendations we will forward to the President this fall for the FY 1998 budget. We have no illusions about the likelihood that NASA's budget for FY 1998 will be higher than our FY 1997 request of $13.8 billion NASA's managers fully understand the imperative of reaching a balanced budget for the Federal Government, and do not contemplate the prospect of increases in our funding levels. Indeed, our internal planning assumes a steady decline in our future budgets as we approach the end of the decade.

Hence, NASA's sights are firmly set on the imperative of doing even more exciting science and more technology advances for less money. We have committed to achieve reductions in our future budget levels by first addressing the need to change *how* we do business in NASA. That means reducing our civil service personnel complements, closing facilities, further tightening our administration and management practices, reducing procurement costs, consolidating, and eliminating activities of marginal added value. We know the future will be tough, and that our programs will have to be both of high merit and affordable.

The contributions NASA is currently making, and will make to an even greater extent in the future, address each of the national science and technology goals:

- Maintaining World Leadership in Science, Engineering and Mathematics;
- Promoting Long-term Economic Growth that Creates Jobs;
- Sustaining a Healthy, Educated Citizenry;
- Improving Environmental Quality; and,
- Harnessing Information Technology.

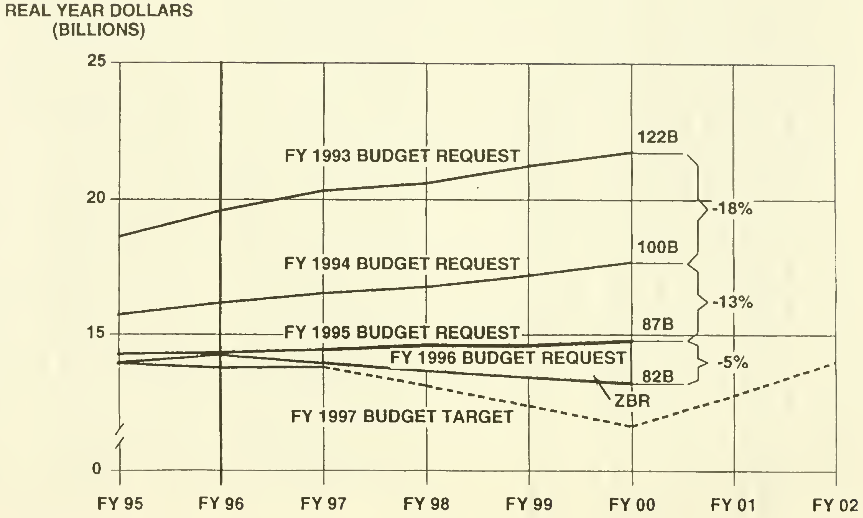
I am confident that the Administration will request budget levels for NASA in FY 1998 and subsequent years which are consistent with maintaining NASA's vital contributions to these goals. Our budget recommendations for those years will be submitted with a clear linkage between the spending levels and the policy guidance laid out by the Administration and the Congress. I see no reason to sound the alarm now about future budget prospects for NASA. The past four years have taught me that the amounts actually appropriated by the Congress will be based on NASA's ability to make a case that our programs merit funding. While I respect the views of those who argue that programs should be terminated now because there may not be sufficient funding for those programs in the future, I do not agree with them.

My counter to that argument is based on the evidence: Over the past four years, there have been many doubters that NASA could and would change to meet the challenges of doing more with less. Those critics were convinced that NASA would not step up to make the hard decisions; that the Agency was too entrenched in the various NASA cultural mores to change its way of doing business; that NASA would not examine, much less incorporate, technology advances emerging from Defense R&D programs. The doubters were wrong. Our NASA managers, scientists, engineers, contractors, and suppliers have proven them wrong. Together, we stepped up to the challenge. Those dramatic results in NASA's budget over the past four years are reflected in the attached chart.

Let me close by saying that I know this Administration is committed to retaining the vibrancy of our NASA's programs and, where appropriate and necessary, will explore the availability of funding for new starts that stimulate further economic, scientific and technological advancement I believe the Congress now and in the future shares the Administration's commitment. For our part in NASA, our responsibility as servants of the taxpayers demands that we reject any assumption that NASA as a Federal agency is somehow entitled to a given level of funding in the future. We recognize that NASA's programs, no matter how meritorious, are elements of discretionary spending by the Federal government. Each year, we should compete for the taxpayers' dollars by demonstrating the relative merits of our programs against other worthwhile programs. That competition is good and healthy. If we can make the case, we are convinced the President and his Administration and decisionmakers here in Congress will provide sufficient funding in the future to support those meritorious aeronautics and space programs.

Mr. Chairman, that concludes my prepared remarks. I would be pleased to respond to any questions you or other Members of the Committee might have

FY 1997 PRESIDENT'S BUDGET



The CHAIRMAN. Thank you, Mr. Goldin. Dr. Krebs.

STATEMENT OF DR. MARTHA A. KREBS, DIRECTOR, OFFICE OF ENERGY RESEARCH, UNITED STATES DEPARTMENT OF ENERGY

Dr. KREBS. Thank you, Mr. Chairman, members of the committee.

I am here today to present my perspective on science and technology issues in the department's budget as assumed in the President's 1997 budget plan and in the FY 1997 congressional budget resolution. Everyone in the Administration is committed to doing their part to achieve a balanced budget by 2002, as outlined in the President's plan.

Within the Department of Energy, alternatives are being identified for consideration by the Secretary and the President as they determine the overall budget priorities for future years, consistent with the Administration's commitment to protect the overall investment in education and the environment.

We are not strangers to this task in the department. We have made difficult budget decisions in the past three years.

At the department, we have taken substantial steps to reduce our expenditures. Our budget has been reduced by nearly $3 billion since 1993. And, we have reduced our contractor workforce by 20,000 and our federal workforce by 1,300.

Nevertheless, we are under no illusion that accomplishing the task of a balanced budget is a daunting one. But, we are committed.

The key to success is preserving the President's flexibility to shift priorities each year within discretionary spending caps based on changing national needs and opportunities. Our efforts are focused on maximizing our flexibility and effectiveness in providing world-class scientific research.

The funding levels projected for the programs for which I am responsible in the President's plan beyond 1997 will be a challenge. However, in both the congressional and executive branch budget processes, appropriation decisions for individual programs are made on an annual basis.

During each year's process, there will be opportunities to tie funding proposals to specific policies, priorities and goals. I am confident that this process will make it possible to propose budgets each year which meet priority needs within the proposed discretionary ceilings.

I know that the Secretary and the Deputy Secretary of Energy understand the importance of the department's science programs and will continue to support them, as they have done for the past three years. More importantly, the President's commitment to U.S. world leadership in science, math and engineering has been unwavering.

Fortunately, the President has proposed a ceiling for discretionary spending that is considerably higher than that of the Congress in every year, including 1997. Were the Administration's ceilings to be adopted by the Congress, they would afford considerably more flexibility and opportunity for the nation's and the Department of Energy's science programs.

The basic science programs of the Department of Energy will continue to advance the capability to meet DOE's missions. Our enduring major experiments and user facilities will continue to be open to university, industry and national laboratory users, many of whom are funded by the National Science Foundation and the National Institutes of Health.

We will make more contributions in areas of broad national interest, for example, in the Human Genome program, which originated in the Department of Energy.

Substantial reductions in such programs would have adverse impacts on users funded by other agencies and entities, as well as by those users funded by the department.

In closing, I would simply like to say that the future of science is too important to be settled by a partisan debate, especially when the Administration and the Congress have both committed to balance the budget by 2002. Having spent six years on congressional staff with this committee, I know at close hand the challenges and difficulties that Members of Congress face in making tough decisions when choosing to allocate a limited amount of funding among worthy programs.

As the Director of Energy Research, I have come to know about the same difficulties that face the Executive Branch. And, I am convinced of the President's commitment and to those around him to science as well as to fiscal responsibility and accountability.

We are having this discussion today because the American people are demanding a balanced budget. They are entrusting us, in both legislature and the Administration, to do it responsibly and without foregoing our global leadership in science.

Yesterday, I had the pleasure of meeting with the summer interns in the Office of Energy Research. They range in age from high school students to young women who have just completed their bachelor degrees and are doing the internships with the hope of finding some employment, whether it is in an agency with a scientific and technical background because they are interested or trained or just because it is something that they recognize would be an interesting career for them.

These are the people who are going to be impacted by the decisions we make over the next months and years. They shouldn't have to stand for second best.

And, they will hold us responsible if we can't come to some kind of bipartisan agreement about how the future of science and technology funding should meet the commitments that we have been able to make in the past. I urge you to sustain this committee's tradition of bipartisan cooperation for our scientific future, for our children.

And, working together, I believe that we can do this. Thank you, Mr. Chairman.

[The prepared statement of Dr. Krebs follows:]

Statement of Martha A. Krebs
Director, Office of Energy Research
United States Department of Energy
before the

Committee on Science
U.S. House of Representatives

July 24, 1996

Mr. Chairman and Members of the Committee, I am here today to present my perspective on science and technology issues in the Department's budget as assumed in the FY 1997 Congressional Budget Resolution, and in the President's budget plan beyond FY 1997.

Everyone in the Administration is committed to doing their part to achieve a balanced budget by 2002 as outlined by the President's plan. Within the Department of Energy, alternatives are being identified for consideration by the Secretary and the President as they determine the overall budget priorities for future years along a path that will balance the budget by 2002, consistent with the Administration's commitment to protect the overall investment in education and the environment.

We are not strangers to this task; we have made difficult budget decisions in the past three years. At the Department, we have taken substantial steps to reduce our expenditures: our budget has been reduced by nearly $3 billion since FY 1993, and we have reduced our contractor workforce by nearly 20,000. In the last year alone we've reduced our overall federal personnel level by nearly 1,300.

Nevertheless, we should be under no illusion -- accomplishing our objective will be a daunting task, but we are committed to achieving a balanced budget. The key to success is preserving the President's flexibility to shift priorities each year within discretionary spending caps, based on changing national needs and opportunities. Our efforts are focused on maximizing our flexibility and effectiveness in providing world-class scientific research. The outyear funding levels projected for the programs I am responsible for in the President's budget plan beyond FY 1997 will be a challenge for us to meet.

However, in both the congressional and executive branch budget processes, appropriation decisions for individual programs are made on an annual basis. During each year's process, there will be opportunities to tie funding proposals to specific policies, priorities and goals. I am confident that this process will make it possible to propose budgets each year which meet priority needs, within the proposed discretionary ceilings. I know that the Secretary and Deputy Secretary of Energy understand the importance of the Department's science programs and will continue to support them as they have done for the past three years. More importantly, the President's commitment to U.S. world leadership in science, mathematics, and engineering has been unwavering. The President has repeatedly called for cutting lower priority spending while investing in science and technology and other priorities that will raise living standards and the quality of life for all Americans.

Fortunately, the President has proposed a ceiling for discretionary spending that is considerably higher than that of the Congress in every year, including FY 1997. Were the Administration's ceilings to be adopted by the Congress, they would afford considerably more flexibility and opportunity for the Nation's and the Department of Energy's science programs.

The basic science programs of the Department of Energy will continue to advance the capability to meet DOE's missions. Our enduring major experiments and user facilities will continue to be open to university, industrial, and national laboratory users, many of whom are funded by the National Science Foundation and the National Institutes of Health.

We will make more contributions in areas of broad national interest. For example, the Human Genome Program originated in the Department of Energy. We were concerned about the genetic effects of energy-related nuclear radiation and chemical byproducts. The national Human Genome Program now relies on DOE's capabilities for managing and distributing enormous amounts of scientific data. The program depends on DOE and co-developed technology for better sequencing, cloning, and mapping of the genome. Substantial reductions would have adverse impacts on users funded by other agencies and entities, for example in the field of structural biology.

The future of science is too important to be the basis for a partisan debate in this area when the Administration and the Congress have agreed to balance the budget by 2002.

Having spent six years on Congressional staff with this Committee, I know close at hand the challenges and difficulties members of Congress face in making tough decisions when choosing to allocate a limited amount of funding among worthy programs. As the Director of Energy Research, I also know President Clinton's strong commitment to science, as well as to fiscal responsibility and accountability.

We are having this discussion today because the American people are demanding a balanced federal budget. They're also entrusting the Legislative and Executive branches to do it responsibly and without foregoing our global leadership in science. The American people will not and should not stand for second best. Our children and grandchildren will hold us responsible if we do not do the right thing.

I urge you to sustain the committee's tradition of bipartisan cooperation for the sake of the Nation's scientific future. Working together, Congress and the Administration can continue our National commitment to basic research and sustain the wellspring of U.S. world leadership in science and technology that has been largely responsible for today's prosperity, and the promise of our future.

The CHAIRMAN. Thank you, Dr. Krebs. Dr. Lane.

STATEMENT OF NEAL F. LANE, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Mr. LANE. Thank you, Mr. Chairman, members of the committee. I really do appreciate having the opportunity to appear this morning to discuss the funding outlook for research and education.

This is truly a time of uncertainty and contradictions for science and engineering in America. We have never witnessed a more exciting era for discovery and progress across the whole spectrum of research and education.

But, the funding outlook stands in stark contrast to this atmosphere of discovery and progress. It raises difficult questions about our ability to continue extending the frontiers of science and engineering to addressing pressing social and environmental concerns, to give our workforce the technological expertise needed to boost their productivity and to spark technological innovations and advances that drive economic growth.

It is clear to all of us today, both in the Administration and in the Congress, that we share a commitment to bringing the federal budget into balance. The President's 1997 budget reaches balance in the year 2002.

And, he is committed to reaching that goal. In fact, the President's budget proposes annual caps on total discretionary spending through 2002 to lock in the savings he has proposed.

The President has also emphasized that a balanced budget must not come at the expense of vital investments in our future. His budget, therefore, protects his commitments to such areas as education, environment and other priorities.

It, nevertheless, goes without saying that a balanced budget is far from a fait accompli. The hardest decisions lie ahead in the year-by-year decisions made through the annual budgeting and appropriations process.

A balanced budget by 2002 will occur only if we exercise dedication and vigilance year in and year out to hold the line on spending while protecting the vital investments in our nation's future.

It's understandable, therefore, that all of us share some measure of frustration as we move from broadly-based budget blueprints to the actual year-to-year allocations of budget authority. I often tell people the devil is not just in the details, it's in the bottom line here.

Al Teich and his colleagues at the AAAS deserve credit for fostering a dialogue on the implications of these budgets. These figures, of course, are real. But, they are not set in stone.

I fully expect to take advantage of opportunities to justify stronger support for research and education within the Administration's annual budget discussions and the recognition that increases in one area will require reductions elsewhere. This is in the same way the authorizing committees and appropriations committees here in Congress will undoubtedly continue to allocate funds and exercise oversight on a year-by-year basis.

I will work as hard as I can with both the President and the Congress to secure adequate funding each year for all of NSF's investments in research and education. This will be an immense challenge, which is mediated to a degree by the fact that the President's budget provides more discretionary funds in each year from 1998 to 2002.

Indeed, before we devote too much time to analyzing the precise details of the decisions that lie years away, I would remind the committee of an insightful phrase often attributed to the great physicist, Niels Bohr, "prediction is very difficult, especially about the future."

In this context, it is instructive to look back nearly a decade to what was perhaps the most famous set of outyear projections ever for NSF. The 1988 Presidential budget request outlined a plan to double the NSF budget over six years.

By contrast to the projections in the current budget, the year-by-year estimates in the doubling plan were exhaustively discussed and studied. They were explicitly endorsed by the President, made the centerpiece of a five year plan developed by the Foundation, and they were approved by Congress with only minor modifications in authorizing legislation.

Even with this high level of planning and bipartisan support, the estimates were revisited each year in the development of the President's budget and the annual appropriations process. In fact, for every year of the doubling period, both the President's request and the corresponding appropriations fell short of the initial projections.

In the end, while the NSF budget had increased substantially, it was nowhere near the original plan. I share this story, Mr. Chairman, simply to reinforce that for better or worse, budgeting has been, and always will be, an annual exercise for both the executive branch and the Congress.

As this story illustrates, that fact worked against NSF a decade ago. In the current environment, it provides us with at least some measure of comfort.

In closing, let me just restate that all of us in the Administration remain committed to working with you and your colleagues on both sides of the aisle to keep America on a solid fiscal foundation. As we push forward toward a balanced budget, it is vital that we preserve NSF's diverse portfolio of high risk, high return investments in science and engineering research and education.

Doing so will require vigilance, determination and thoughtful planning in both our long range outlook and in the actual budget decisions we make each year.

Thank you very much, Mr. Chairman, for the opportunity to appear this morning. I will be happy to answer your questions.

[The prepared statement of Mr. Lane follows:]

The Effect of A Six-Year Balanced Budget on Civilian R&D

Committee on Science
U.S. House of Representatives
July 24, 1996

Testimony of
Dr. Neal F. Lane
Director
National Science Foundation

Mr. Chairman, Congressman Brown, members of the Committee, thank you for the opportunity to appear this morning to discuss the funding outlook for research and education.

This is truly a time of uncertainty and contradictions for science and engineering in America. We have never witnessed a more exciting era for discovery and progress across the spectrum of research and education: we have discovered planets orbiting suns outside our solar system; we are unlocking the secrets of the genetic code of plants and animals; and our schools are transforming and improving the teaching of mathematics and science at all levels.

The funding outlook stands in stark contrast to this atmosphere of discovery and progress. It raises difficult questions about our ability to continue extending the frontiers of science and engineering, address pressing social and environmental concerns, give our workforce the technological expertise needed to boost productivity, and spark the technological innovations and advances that drive economic growth.

It is clear that all of us here today, both in the Administration and in the Congress, share a commitment to bringing the Federal budget into balance. The President's 1997 budget reaches balance in 2002, and he is committed to reaching that goal. In fact, the President's budget proposes annual caps on total discretionary spending through 2002 to lock in the savings he has proposed.

The President has also emphasized that a balanced budget must not come at the expense of vital investments in our future. His budget therefore protects his commitment to such areas as education and the environment.

It nevertheless goes without saying that a balanced budget is far from a fait accompli. The hardest decisions lie ahead -- in the year-by-year decisions made through the annual budgeting and appropriations process. A balanced budget by 2002 will occur only if we exercise dedication and vigilance year-in and year-out to hold the line on spending while protecting vital investments in our nation's future.

It is understandable therefore that all of us share some measure of frustration as we move from broadly-based budget blueprints to the actual year-to-year allocations of budget authority. I often tell people the devil is not just in the details, it's in the totals. Balancing the budget will put significant pressure on domestic discretionary spending. It is clear that there will have to be significant reductions in this particular component of the Federal budget.

Al Teich and his colleagues at the AAAS deserve credit for fostering a dialogue on the implications of this trend. This clearly deserve further discussion, and we must proceed with caution as we examine these investments each year.

Mr. Chairman, I know you have a number of specific questions about certain components of the out-year projections for NSF contained in the President's balanced budget plan. As I noted earlier, both the President's proposals and the Congressional Budget Resolution have protected NSF's total budget and left us with a relatively healthy bottom line.

These figures of course are not set in stone. The President has expressed his intent to revisit agency funding levels each year, while abiding by the totals specified in the discretionary spending caps. In this same way, the authorizing committees and appropriations committees here in the Congress will undoubtedly continue to allocate funds and exercise oversight on a year-by-year basis. I should also add that I will work as hard as I can with both the President and the Congress to secure adequate funding each year for all of NSF's investments in research and education.

Indeed, before we devote too much time to analyzing the precise details of decisions that lie years away, I would remind the committee of an insightful phrase often attributed to the great physicist, Niels Bohr: "prediction is very difficult, especially about the future."

In this context, it is instructive to look back nearly a decade to what were perhaps the most famous set of out-year projections ever for NSF. The FY 1988 Presidential budget request outlined a plan to double the NSF budget over six years. By contrast to the projections in the current budget, the year-by-year estimates in the doubling plan were exhaustively discussed and studied. They were explicitly endorsed by the President, made the centerpiece of a five year plan developed by NSF, and they were approved by Congress with only minor modifications in authorizing legislation.

Even with this high level of planning and bipartisan support, the estimates were revisited each year in the development of the President's budget and the annual appropriations process. In fact, for every year of the "doubling period," both the President's request and the corresponding appropriations fell short of the initial projections. In the end, while the NSF budget had increased substantially, it was nowhere near the original plans.

I share this story, Mr. Chairman simply to reinforce that for better or worse, budgeting has been and always will be an annual exercise for both the executive branch and the Congress. As this story illustrates, that fact worked against NSF a decade ago. In the current environment, it provides us with some measure of comfort.

In closing, let me just restate that all of us in the Administration remain committed to working with you and your colleagues on both sides of the aisle to keep America on a solid fiscal foundation. As we push forward toward a balanced budget, it is vital that we preserve NSF's diverse portfolio of high-risk, high-return investments in science and engineering research and education. Doing so will require vigilance, determination, and thoughtful planning in both our long-range outlook and in the actual budget decisions we make each year.

Thank you for the opportunity to appear this morning. I'll be happy to answer any questions.

The CHAIRMAN. Thank you. And, I thank each of the members of the panel. And, I thank you for your concise testimony to this committee.

Each of you made the point that this whole business of budgeting and allocation of resources is, in fact, a year-by-year process. And, that's very true unless we get one of the reforms we've talked about, and that is a bi-annual budget one of these days.

And, I understand that it is a good way to look at it from your perspective at the present time, because in the Administration's budget in 1997 virtually all spending goes up in 1997. And, it is the outyears that have given this committee some problem.

I wonder, however, why it is that the outyears are not now a concern when they were a concern last year when this Congress put forth a budget for balancing. We had some outyear projections that the Administration, including a couple of you at the table, then promptly went out and talked to the country about and told people how we were devastating science because of the outyear figures, looking beyond the year-by-year process.

I am just wondering how we now reconcile the fact that the story last year is very different than the story that you've presented to us here today?

Mr. GOLDIN. I will take a crack at that. If you will remember, last year there was a proposal by the Congress to cut the budget. And, then NASA had an additional $5 billion challenge issued it by the Administration.

When I first presented this dual set of challenges to the NASA staff, there was an initial state of panic when we took a look at it. The reaction from the Congress was about the same, that this is impossible; we will have to cut programs.

We took a week or two. Cooler heads prevailed. And, we said, "We've been issued a challenge. Let us see if we can try and do the right thing."

And, we set out to see if maybe NASA wasn't as efficient as we thought it was. And, we found close to $5 billion of reductions that we could take without compromising the quality of our programs.

I remember the exercise going year to year. The first year we got a cut from the Congress, we said, "Woe is us at NASA."

And, as I look at it, we learn a little more each year. We are getting rid of old habits.

And, if we try and project too far out, we have problems. And, I think this is just part of the learning process that we are going through.

But, I think this is the right way to go.

The CHAIRMAN. Dr. Krebs.

Dr. KREBS. I think that, you know, from the Department of Energy's perspective, beginning last year and, in fact, beginning at the time that Secretary O'Leary became the Secretary, she made a commitment to the President that was accelerated in the 1995 budget that we would achieve efficiencies. And, so within the Department of Energy, it's not that the outyears haven't been important.

In fact, we have known from the very beginning of Secretary O'Leary's term and accelerated by the President in last year's, in the 1996 budget that we were going to be achieving savings of over

$14 billion over the next five years, starting from 1996. And, so from my perspective, in my programs, the outyears have never not been a concern.

But, the record is from the—looking at our 1997 budget, as we went year by year, in the discussions last year, within the Administration, despite the reductions that were being proposed for the department overall, we were able to sustain a slight increase in the science programs. And, so that's one of the reasons why I have some confidence that as we go forward year-by-year within the President's framework that we will continue to be able to argue—and if we are successful, we will see at least a program that will allow us to sustain the assets that we've built up over the last 50 years.

The CHAIRMAN. Dr. Lane.

Mr. LANE. Mr. Chairman, we also take the outyear numbers seriously. We, as I said in my remarks, will work very hard to argue for the best budgets that we can on a year-by-year basis.

We believe because the President's overall discretionary spending plan has more money in it there is opportunity there for us to be successful in our arguments. But, in the meantime, in our planning with the National Science Board we look hard at those outyear projections; and, especially in considering large activities, large facilities and other long term commitments we, in fact, look very hard at insuring that the plans we make now are consistent with the possibility of not such good budgets.

The CHAIRMAN. My time has expired. And, I think I will go on to other members.

But, I would just make the point to you that all of you have just answered that, in fact, you have to do long term planning in order to make competent decisions. Now, that's what the Congress was attempting to do as well.

And, we came under heavy fire from those of you within the science community in the Administration last year for having laid out a real plan for how you got there by setting priorities. And, I will come back to that.

Let me go next to Mr. Weldon.

Mr. WELDON. I thank the Chairman. My first question would be to Mr. Lane.

You quoted the President as saying that he was not going to allow—I will paraphrase it—a balanced budget to come at the expense of vital investments in our future. I would like to talk about that comment a little bit.

Do you consider a balanced budget a vital investment in our future?

Do you know if the President does?

Mr. LANE. Well, Mr. Weldon, I can't speak for the President on that matter. It has been clear to me all along that the Administration is strongly committed to balance the budget by the year 2002 and that the reason for doing that, I think, is the reason we all argue for a balanced budget, because the weight of those deficits falls on our children and our grandchildren.

So, it is about the future.

Mr. WELDON. Well, I would respectfully disagree with you. I don't think the President is serious about balancing the budget.

The only reason he produced the balanced budget product is because he was getting sufficient pressure to do that. And, I personally consider it a vital investment in our children's future.

I have Kennedy Space Center in my district. We employ 16,000 civil service and contractor personnel there, 15,000.

And, the rate things have been going here in Washington where we now have, I think, $365 billion going to pay interest on the debt because nobody was willing to make the tough decisions in the past. We have vital programs like yours and like vital research in the Department of Energy and like NASA coming under a tremendous amount of budget pressure because nobody was willing to make the tough decisions.

And, in these kinds of programs, I honestly believe you have to do a great deal of long range planning. And, I'm not trying to beat you up. I just found that to be a very interesting comment, because I consider our ability to continue to make vital investment in the National Science Foundation, in the Department of Energy, in NASA is totally—it's totally dependent on our ability to balance the budget.

I mean, we've got 52 percent going out to pay entitlements. We are totally unable to make any serious entitlement reform with this President.

He's demagoging on all the crucial issues. And, this has a vital role to play in our future investment in science and technology like NASA.

Let me get to some more, I think, germane questions to what we are discussing here. Mr. Goldin, you stated that "NASA is hard at work developing the recommendations we will forward to the President this fall for the FY 1998 budget."This statement seems to contradict your previous testimony on the Hill regarding NASA not taking any precipitous action to meet the outyear targets.

Can you just explain that a little bit?

Mr. GOLDIN. I wouldn't be presumptive in what we are going to say in 1998. We are working that right now.

I don't believe we are going to take any precipitous actions. And, when you see our 1998 budget, which we submit to the OMB in September, and it gets presented to the Congress in January or February, I think we are going to stick with that statement, that we are not taking presumptive actions. And, I remain optimistic we are going to work it.

Let me also add at this point. When we are going to argue for our budget, I will be an advocate, not just for NASA's budget but for R&D, which is something I feel strongly about.

And, I hope that we will not just argue among R&D agencies as to what goes up and what goes down. I intend to forcefully argue that R&D is a basic element of the future of this nation.

And, it is not my intent to try and see that Dr. Krebs' budget or Dr. Lane's budget suffers at the expense of NASA. I intend to fully argue the R&D issue.

And, I intend to be very intense about this, both with the Administration and the Congress, as I have been in the past.

Mr. LANE. Mr. Chairman, may I add to that comment?

The CHAIRMAN. Sure, go ahead.

Mr. LANE. I want to join Dan Goldin on that one. That is a very important point that he has made.

It is critically important to the nation's science and technology enterprise that the various agencies that support these activities in different ways have healthy programs that are coordinated, that are interactive, that work in our own national laboratories and our own universities. And, deep cuts in one area simply reverberate around the system in ways that are really not helpful to the whole.

Mr. WELDON. The FY 1998 Administration estimate for NASA was $13.1 billion; is that correct, Mr. Goldin?

Mr. GOLDIN. In the fiscal 1997 budget, it was, yes.

Mr. WELDON. Okay.

Mr. GOLDIN. As, by the way, the congressional budget mark for NASA in fiscal 1998 was $13.065, I believe.

The CHAIRMAN. The time of the gentleman has expired. Mr. Volkmer, I apologize to you. I didn't see you come back in.

I would recognize you at this time.

Mr. VOLKMER. That's all right, Mr. Chairman. I don't plan to stick around.

To be honest with you, Mr. Chairman, in listening to the gentleman from Florida ask his questions and some of the other statements that have been made here, I don't see how this hearing is really going to assist us in the future, whether it's NASA, whether it's NSF or the Department of Energy. It's a political witch-hunt.

It's trying to make the President look bad on his budget. That's all this whole thing is about.

You know, we have—or, you, as Chairman, at least, brought this committee down to where it's attempted to be a political arm of the Republican party. That's the way I see it.

I think it's a lot of foolishness.

Mr. WELDON. Would the gentleman yield?

Mr. VOLKMER. It has no purpose. I, for one, have been here—and you have been here 20 years. I suggest to you, if you are concerned about what the budget is going to be for any of these agencies or any other agency in the year 2002 or the year 2000 or the year 1999 or any other time, and you think that just because you've got a budget now that says it's going to be a certain figure, that you think that's what the figure is going to be, I suggest that you go back to when you first came here and look at some of the budgets then and what they projected in the next four to five years, even under the Reagan Administration, and tell me if they hit the target. Tell me if that was the actual dollar figure.

I think I've heard some wisdom here from these witnesses. But, basically we will determine next year's budget when we come on out to next year. And, that's basically what happens.

It's interesting to me that you and the Republican party are so knowledgeable about the economy that you can tell me what the economy is going to be for certain in the year 2000, 2001 and 2002. I will have to admit, I don't know. I'm afraid that I can't say.

Basically, I consider this an effort to try to make the President of the United States, who has done an outstanding job as far as I'm concerned—and he wants a balanced budget. You say he doesn't. The rest of you say he doesn't. I say he does.

Some of us want it really bad and been here working on it a lot longer. I would say this President wants it a lot more than Reagan or Bush ever wanted it. He has shown it.

Since 1993, we've had deficits go down. Under Bush, they went up every year. Under Reagan, they went up every year.

Under Clinton, they've gone down every year. Under your budget for this year, they will go up again next year.

Now, under the Democratic Coalition budget, they went down. So, if you want to talk about balanced budgets—and that's basically what you are saying here that the President is playing games. I think you are playing games, too.

You have been playing games all along. You say one thing and do another.

President Reagan did that. They called him the teflon president. None of it ever stuck. He could do that, and he got away with it.

I don't think you and Newt Gingrich are going to get away with it. I've had enough.

The CHAIRMAN. Well, I think we thank you, Mr. Volkmer. And, I take it you didn't have a question.

Mr. VOLKMER. I have no questions.

The CHAIRMAN. Mr. Gutknecht.

Mr. GUTKNECHT. Mr. Chairman, I am afraid I have to respond somewhat to my friend from Missouri. He said that this hearing is about, you know, trying to make the President look bad and using the Republican rhetoric.

I would disagree with the gentleman from Missouri. Actually, if anybody is questioning the President's commitment, it is his own budget director, Alice Rivlin.

And, you know, we have in front of us some articles where on one hand we are saying, "Yes, we are going to cut $67 billion to achieve a balanced budget," but we don't know where we are going to make those cuts. On the one hand, we have a plan going out into the future, but at every turn the Administration says, "But, don't take those numbers seriously. We really aren't going to cut these programs. We really aren't going to do this."

I think there is a difference now. And, I think this Congress is committed to this.

I mean, we are serious. And, we understand there are going to be consequences.

Actions have consequences. And, there's not a scientist in the room who doesn't understand that.

And, I think my colleague from Florida has said it very clearly, that the fact that the Congress has been irresponsible in the past does not give us an excuse to be irresponsible in the future.

And, I happen to believe in research. And, I think there's an awful lot of basic research that goes on that's funded by the Federal Government that would not happen if it weren't for federal resources.

But, as we go forward, if we aren't serious about controlling the deficit and reducing this debt, the debt and the interest on the debt are going to consume us all. This is not an issue between Republicans and Democrats.

It's not even right versus left. It is right versus wrong.

And, it has been wrong what this Congress has been doing in the past. And, now is the time we have to change our course of action.

And, the frustration we face is that, on one hand, we hear an Administration who says, "Yes, we are committed to working with the Congress to balancing the budget by the year 2002," and then we read news releases and we have the Secretary of Veterans Affairs and others going out to various constituent groups and saying, "But, don't worry, we aren't going to cut you."

Well, I mean, that may make for good politics in an election year, but it doesn't make for being responsible as we go forwarding the future.

I admire the work that Mr. Goldin and NASA have done. And, I think you have risen to the challenge.

And, I can't say enough about the way you are working with Congress and with the Administration and with all of us to ensure that we can have a presence in space in the future. And, as I say, I can't say enough good about the things that you have done.

But, it is frustrating when one side says something and the other side says something else. And, we are just trying to figure out how is this really going to affect the future of federal research, federally-sponsored research, as we go into the future.

And, I'm sorry, I'm giving more of a speech than asking a question, too, Mr. Chairman. But, I think this kind of thing needs to come out, because we can't be honest with our kids and we can't be honest with the people of the United States if we are saying one thing to one constituent group, another thing to the Congress.

We say we want a balanced budget, but then on the other hand we are not willing to really face the realities that are in front of us. So, I'm sorry that the gentleman from Missouri has left, but I think these are issues that need to be explored, need to be expressed.

And, I think whether you are in the science community or whether you are a taxpayer in the United States, you need to have the facts out on the table, because Thomas Jefferson said this a long time ago and he was right then. He said, "Give the American people the truth and the republic will be saved."

But, you can't have a republic that is going to be saved if you have, you know, statements on one hand saying this is our budget plan and then going out and saying no, that's not really our budget plan. I feel very serious about our budget plan.

As a matter of fact, I am going to go over to the Floor of the House in a few minutes to offer an amendment to recover the fumble, because the gentleman from Missouri was correct in one thing, that this Congress has fumbled on one area. We are allowing spending to go up next year by $4.1 billion more than we agreed to last year.

That was a mistake, in my judgment. And, I am going to go over and offer an amendment on the Floor of the House to reduce spending across the board, again 1.9 percent, because I think when you say you are going to do something you ought to do it, you ought to stick to the plan.

If we do that, we can have a bright future for our kids and for federally-supported research here in the United States.

I yield back the balance of my time.

The CHAIRMAN. The Chair thanks the gentleman. I think the next time I am going to put the members on the witness list, and that way we will get a——

[Laughter.]

The CHAIRMAN. Mr. Wamp.

Mr. WAMP. Thank you, Mr. Chairman. Before I ask one question of Dr. Krebs and one question of Mr. Lane, both of who I have a very high regard for, I want to say that I'm sorry, Mr. Chairman, I couldn't be here Monday night. The portrait of you on the wall is a welcome addition to this room.

It is, indeed, a privilege and an honor to serve on this committee under your leadership. And, I commend you and I'm sorry that I wasn't here Monday night.

But, actually my father, Don, and my mother, Beth, who are in the room at this point, are here this week. And, I was with them. So, if you will, please accept my apology and welcome to my parents.

The CHAIRMAN. Well, I thank the gentleman. And, we do welcome your parents. We are delighted to have you with us.

Mr. WAMP. Dr. Krebs, your opening statement was very direct and to the point. It was very generic, though.

And, specifically, I'm sure you wanted to address how your view, especially in the outyears, 1998 through 2002, your priorities would line up in the areas of basic energy sciences, fusion, environmental research and high energy physics. Just give us an overview of where you think our priorities should lie in those outyears.

Dr. KREBS. Let me—you know, it's very difficult for anybody who supports basic science to—or who is a mother to choose amongst children. The reality for the programs, for the science programs, in the Department of Energy is that since 1993 we have essentially, and with the termination of the Superconducting Super Collider, the science programs within the Department of Energy have been essentially dealing with constant dollar budgets.

In some cases, that is a result of congressional action. For example, we tried to recover in the High Energy Physics program a healthy program in the 1996 budget by adding about $40 million to a constant dollar level. And, we received only about $12 million above that. At least, I recall that that's about the level of reduction that the Congress imposed.

So, overall the programs within—the basic science programs within the Department of Energy have been constant dollars. So, we have been absorbing inflation over the last two to three years.

And, within that, we have been able—because we have been focused on saving money, reducing unnecessary work at our laboratories, we have been able not only to sustain the level of effort overall but we have also been able to consider starting some important new activity. For example, we have been able to sustain the scientific facilities in the basic energy science programs.

We have been able to conceive of, if we could stay at flat dollars, significant participation in the Large Hadron Collider within the High Energy Physics program. We have also been able to restructure or to consider restructuring the Fusion Energy program into a Fusion Energy Science program.

All of these activities have been supported by the Administration and in the outyears, I think, are crucial to carry on as we would go forward, because these are contributions not only to the Department of Energy's missions but also to efforts that are being carried out by other agencies as well.

Mr. WAMP. Thank you, Dr. Krebs. I'm sure you will keep me posted on where you see those priorities shaping up in the months ahead.

Mr. Lane, I really believe that nuclear weapons' needs drove our science and energy policy for many, many years. And, now that the Cold War is over, what I believe our country needs to establish is for the sake of the national labs and science policy and energy policy.

What should drive science? What should drive energy policy now that it's no longer the need to build up our nuclear arsenal that really drives it all?

Is it materials technology, biological technology, computing technology? What do you believe, from the perspective of the National Science Foundation, should drive our investment into the future?

That's a generic question. I know we are here to talk details on the budget, but I think you can't really look at the budget and invest and prioritize properly until we decide as a nation what should drive our policy.

Mr. LANE. Mr. Wamp, that's an excellent question. I believe that the Cold War was very significant in our understanding how the federal investment for R&D and science technology was developed over these last 40 years.

But, Vannevar Bush, who wrote this report, "The Endless Frontier," that led to the founding of the National Science Foundation, had a much broader perspective, a rich perspective, on how and why science and technology were important to the American people. And, national security was a very important part of that.

But, there were many other areas, including health and energy and other such areas. I think that remains important today.

What I believe we have to keep in mind now is two things about science and technology and the federal investment in R&D. One is that we must maintain world leadership in all the important fields of science and engineering.

We can debate together which are the most important fields. And, that is an important debate to have.

But, if we don't stay at least at the frontier so that our people are comparable to the best people in the world in those areas, then we will be in no position to take advantage of discoveries that are made, wherever they are made in the world. And, that will ultimately be bad for the United States.

The second thing I think we must keep in mind—and this one has not been so well articulated, as we need to—and that's the direct connection between the science, engineering, research and education activities that are performed and the ultimate outcomes, the ultimate benefits to the people. What is the scale factor?

Sometimes we argue about funding our R&D efforts at a certain fraction of the gross domestic product. Is that the right measure?

Certainly, there is some kind of scale dependent factor that must be considered in these programs, because we know what really happens is that the technologies and the knowledge that come out of virtually every area of science supported by NSF, Department of Energy, NASA and other agencies, feed into society in a whole complex set of ways. They provide benefits for people. They provide benefits for the economy.

So, that connection to the very real and, in many cases, immediate needs of the people must be made. It's real.

We must do a better job of articulating how it works.

The CHAIRMAN. The time of the gentleman has expired. Mr. McHale.

Mr. MCHALE. Thank you, Mr. Chairman. Mr. Chairman,one of my Republican colleagues just a few minutes ago said that—and he said it with obvious sincerity—the budgetary issues deserve to be explored. And, I agree with that conclusion.

I think those issues, however, can be explored without the unnecessarily harsh partisan rhetoric that we have heard earlier in this hearing. I wish that my good friend, Mr. Weldon, were still here.

I am going to follow up on some of Dave's comments regarding the seriousness of purpose demonstrated by this Administration in attempting to achieve a balanced budget. Mr. Weldon stated that he believed the Administration was not serious in its efforts to balance the budget.

I would submit that the President is very serious in achieving that goal and that his record substantiates that claim.

I am one Democrat who voted for the balanced budget amendment. I voted for a balanced budget. I supported the line item veto.

Contrary to the comments that were made earlier in the hearing, I voted for entitlement reform. I supported the Republican Welfare Bill last week.

The Concord Coalition gave me the second highest deficit reduction rating in the State of Pennsylvania.

Having said all that, as somebody who is utterly serious about balancing the budget, the simple mathematical fact—it's arithmetic, not politics—this Administration has cut the deficit in half in the past four years. Now, that may be an unpleasant fact for some on both sides of the aisle, frankly, depending upon which end of the spectrum you want to talk to, but it is nonetheless a mathematical fact.

This Administration has cut the deficit in half. Now, with that as a prelude, let me move from politics back to science, if I may.

Dr. Goldin, let me, first of all, extend to you the greetings of the Space Shuttle Blake. The members of that crew asked me to say hello, and I convey that to you.

But, for you, Dr. Goldin, you've taken extraordinary measures to streamline NASA over the past three years. My question is twofold.

Have you found it necessary to cancel any major programs; and, secondly, do you see anything that would force a cancellation of any program now in view of the outyear budgets?

Mr. GOLDIN. The only programs that we cancelled were ones that we felt were poorly managed and didn't have relevance to the American public. And, an example was Tetras 2. Another example was the national aerospace plane, which was terrific in concept but its outyear funding was unacceptable and its ability to technically perform in the near term, it was not ready.

So, we did make those cancellations. And, we did make those hard decisions. We do not believe that it is appropriate to cancel programs prematurely.

Let me say. It is the rate of change of reduction that's important. If you try and come down too fast too soon, you begin to make very bad mistakes and you precipitate actions such as cuts.

If we have a gradual rate of change—and this is where I would like to give the President tremendous credit. We asked for fiscal stability in fiscal 1996 and 1997. And, we got it.

That has allowed us to absorb this $5 billion cut that we were asked to take and to do it in a way that we enhance the science and not hurt the science. So, if we could stay on a slope—and we recognize that our budget is going to come down.

We are not arguing for the budget to go up. We are recognizing the down slope.

We would like to do it in an organized, planned way. And, as I said before, we learn.

And, then we could get the efficiencies. We could perform the prioritizations, and we could weed out marginal activities.

And, let me tell you. There are still marginal activities in NASA. And, we intend to weed them out.

Sometimes, it becomes very difficult because it becomes very personal. We are on a mission at NASA to enrich life in America. Employees that work day-to-day sometimes view their own tenure as the real issue. And, I don't begrudge that.

Mr. McHale. That occasionally happens in the Congress as well.

Mr. Goldin. Well, I would never think that Congress would have that problem.

[Laughter.]

Mr. McHale. My second question, Mr. Chairman, my final question is to Dr. Lane. Of all the questions that we've dealt with, of all the agencies that we have dealt with, the Department of Energy is in the unique position of being a high priority program in the Administration's budget and a low priority in the Republican budget.

How does this disparity affect your ability to plan programs over the full six year period?

Mr. Lane. Mr. McHale, I could comment on NSF, but Dr. Krebs might want to make the comment on Energy.

Mr. McHale. Forgive me. That's what happens when you have got eyes that are not quite what they should be.

I read from the wrong page. I really do address that to Dr. Krebs, please.

Dr. Krebs. Thank you, Mr. McHale.

Mr. McHale. I didn't wear these until I turned 45. And, the adjustment is still being made.

[Laughter.]

Dr. Krebs. Well, I've been wearing these for about five years. And, it takes probably longer than five years to get used to them.

I think the issue is very similar for the Department of Energy, as was just made for the NASA and to which Dr. Goldin spoke. Essentially, the Department of Energy has been in a situation in which it's looking for improving efficiencies, for making reductions in work and programs that are no longer necessary.

And, so what we would like, of course, is a relatively stable and sensible approach to reductions. The kind of debate that has gone on between the Administration and the Congress as to priorities, of course, unsettles that and makes it difficult for us to plan.

I can give you an example in my own area, which has to do with the Fusion Energy program. Clearly, this is something where the Congress and the Administration had major disagreements.

We were given direction by Congress to reduce the program in 1996 by nearly a third but also with the expectation that we would consult with the community and come back with something that would restructure the program towards a basic science oriented program as opposed to an energy technology program. We believe we did that in the 1997 budget.

And, we still find ourselves in a situation in which the Congress expects us to take it down even further. That is the sort of debate and the discussion which is very discouraging and not only for the staff in the programs but also the people at universities and national laboratories, both faculty but also particularly young people to deal with in terms of making plans, not at the level of programs but at the level of careers and their lives.

And, so we need the—you know, we've gotten the message from the Congress. But, in order to plan, we need some kind of stability.

Mr. McHale. Thank you, doctor. Mr. Chairman, my time has expired and I close simply with a plea that we soften our political rhetoric and focus more sharply on the genuine issues of science and technology that the people expect us to address.

Thank you, Mr. Chairman.

The Chairman. Well, I would simply say to the gentleman that both yesterday and today the Chair has made every effort to conduct these hearings in as gentlemanly a fashion as possible to try to get the facts on the record. The Chair is disappointed when people like Mr. Volkmer characterize what we are doing here as a witch-hunt.

I think that there are legitimate questions that have been raised by people as eminent as David Broder about how this process is going forward. The chair continues to think that it's totally appropriate for this committee to ask the right questions about this and not in——

Mr. McHale. Mr. Chairman——

The Chairman. (continuing) —a partisan way at all. And, we will continue to try to do that.

Mr. McHale. Mr. Chairman, I apologize. My comment was not at all addressed toward the Chair. It was addressed toward the membership.

We should raise those questions but not screen them. Thank you, Mr. Chairman.

The Chairman. I would simply say to the gentleman that the first note of partisanship added to the event came from your side of the aisle. And, I think we need to recognize that probably set off a couple of people on our side of the aisle. And, I am disappointed by that.

Mr. Olver.

Mr. Olver. Thank you, Mr. Chairman. At the outset, I am not sure how many times we will have a chance to comment on this, and I wasn't here when it was unveiled, but I congratulate you on the portrait at the back of the room.

I was just wondering whether the conestoga wagon there was one that you travelled in, lived in or——

[Laughter.]

Mr. OLVER. (continuing) —was it merely made in your district?

[Laughter.]

The CHAIRMAN. Well, first, if the gentleman would yield, it was invented in my district, you understand.

Mr. OLVER. I understand. Well, I knew it was invented in Pennsylvania, but I didn't know exactly where.

The CHAIRMAN. Oh, and the fact is we still use them for transportation in my district. So——

Mr. OLVER. Oh, you do.

[Laughter.]

Mr. OLVER. Well, that's good. That's good. That's wonderful. Now, that's a connection that I didn't—I wouldn't have known that exactly.

I am sorry I missed the earlier comments and those by others, so I may be covering some of the same ground that other people have been covering. But, may I ask of the three people—I think I know the answer in the case of NSF, that there is no direct relationship to—no direct relationship to defense of what you do in science.

But, in the other case of DOE, is there a direct relationship of the research done in DOE to defense? And, similarly of NASA?

Dr. KREBS. Well, in terms of the total effort by the Department of Energy, a major element of our programs within the department have to do with the stewardship of the nuclear weapons stockpile for this country. And, as a successor——

Mr. OLVER. And, what in research relates to the nuclear weapons stockpile now?

Dr. KREBS. Well, I——

Mr. OLVER. Does direct money that is appropriated to the DOE go into dealing with the research that is related directly to defense; or, does that all come from the defense budget?

Dr. KREBS. As you—there are direct appropriations within the Department of Energy in an account called Atomic Energy Defense Activities. That funds research, most predominantly at three of the Department of Energy's national laboratories—Los Alamos, Livermore and Sandia. But, it also has some impact at other laboratories as well.

Mr. OLVER. As usual, I can see I have a line of reasoning that if there is a reasoning there might take us a while, and I am going to lose my time very quickly.

Dr. Goldin, is there anything directly in NASA to—I guess maybe I ought to tell you what I am interested in here. Yesterday, in a line of questioning, I think we came, with the help of the gentleman from Michigan, to the idea that there was really a matrix, not three different continua, of defense and non-defense R&D spending and basic research and applied technology continuum and a continuum maybe on government and private research, that these actually fell into perhaps a three dimensional—maybe it's the wrong dimension, but a dimensional matrix and that in that matrix all of these elements had some location.

And, I am curious, in your case, what you think is the relative position of those elements in the research program of each of your agencies.

Now, while you think about that, let me ask—because this was a question that came up last time. What do you think is the amount of R&D that we ought to be doing, recognizing that right now the sum total of all R&D is around 2.4 percent or thereabouts and the proposals on the part of either the Majority or the President take it downward over the next several years to in the range of 2.1 percent with arguments about which agency is up a little bit or down a little bit? But, in sum total, both of them take it down in that direction.

Where should we be from a position of what our science establishment in this country ought to be with all of its goals of providing for energy independence, which has a national security role obviously; or, in the case of defense, very direct needs for defense, which are national security; and, our advancement of the understanding of space and so forth, which clearly has a national security implication?

Where should we be in the amount that we spend on R&D in that whole matrix?

The CHAIRMAN. The time of the gentleman has expired. But, I certainly would want the witnesses to answer the question, since the gentleman did ask a question.

Mr. GOLDIN. With regard to the defense question——

Mr. OLVER. Actually, there were two questions in there, but I went from one to the second, hoping that they might answer both the question of where they viewed themselves within this—what were the most important interrelationships in the matrix and where we ought to be in its sum total.

The CHAIRMAN. That's fine. I would appreciate an answer.

Mr. GOLDIN. Where NASA supports the Defense Department in a direct manner, it's reimbursable to NASA. We do not take it out of appropriated funds that come directly to us.

For example, if the Defense Department would like to do a radar mapping mission, they are paying their portion of the shuttle cost so we can do that radar mapping mission, which has civilian uses and it has military uses.

We also perform a broad range of research and technology that benefits the commercial sector, the science sector and the defense sector like the development of a new launch vehicle. The President has given us direct guidance that we should develop the next—the technology for the next generation of reusable vehicles. So, the Defense Department in the defense of the nation would benefit from it.

But, it's not a direct means. We just provide the technology and corporations will provide the resources.

So, it happens in two different ways.

In another way, NASA is undertaking a broad new program in the area of semi-conductor research.

Mr. OLVER. A fair amount of interconnect.

Mr. GOLDIN. There is a tremendous amount of interconnect that strengthens the nation and I think is called for under the Space Act of 1958. That's the answer to the first question.

In answer to the second question, I want it to be known I have spoken out publicly around the nation about my concern about the investment in R&D. And, this is a statement not confined to Democrats or Republicans, not confined to government, but for America.

I have a very basic concern that says we are so driven to the near term that we are losing sight of the long term. Corporate America doesn't go beyond three to four years in their vista. And, what they call research is really product development and product improvement.

Across the board, universities are not being supported. It is a major problem. Everyone talks about it like the weather, but we have a difficulty as a nation.

And, this again I am emphasizing. It's not a political statement. It's a statement to the status in America.

In a recent survey, students at Harvard in graduation couldn't explain why we have changes in temperature due to seasons. Science and technology is not integrated into the American psyche.

We are number 17 in science and number 14 in math worldwide. This is an issue that is very, very important.

And, this is an issue that we will have to come to grips with. And, this, Mr. Chairman, is what I've been talking about around the country.

And, if it has been interpreted as a partisan issue, it is not. And, I plead everyplace I go.

And, just yesterday, I addressed the aircraft industry of this nation. And, I told them that if we keep on this direction of a derivative-based improvement of our aircraft and don't look at revolutionary changes, America, that has already lost 30 percent market share to air bus, is targeted for another 20 percent and is going to end up flying everybody else's planes as we just make it through the next three to five years.

So, I would say that the percentage needs to go up. And, I want it to be known very clearly here—and I want my friends in OMB to understand—I believe the President has empowered me to go into the OMB as part of this budget crisis, and they are going to have one hell of a fight over the R&D budget because we cannot deal with the present problems of this country and put off the future of this country because our children get no vote.

So, I am going to be in there arguing to increase the percentage of R&D.

Mr. OLVER. So, 2.1 percent is too little for the whole matrix?

Mr. GOLDIN. You better believe it. You better believe it. And, I am going to fight for——

Mr. OLVER. What do you think is the right level?

Mr. GOLDIN. Dr. Lane and Dr. Krebs.

Mr. OLVER. Do you think—do you know what the right—do you have a sense of what the right level is?

The CHAIRMAN. Mr. Olver, I have been willing to let the witnesses answer the question, but we do have other members present.

Mr. OLVER. I am trying to get some numerical business out of them. I had hoped to get it out of all three, of course.

The CHAIRMAN. Well——

Mr. OLVER. But, whether you will allow them to answer, I——

The CHAIRMAN. Well, I am going to allow them to answer. But, if we are going to do follow-up questions, then I am going to have to go to the other Members.

Mr. OLVER. But, I can't get—there was—I wanted to—I asked him how much he thought it ought to be.

Mr. GOLDIN. Can I answer?

The CHAIRMAN. Sure.

[Laughter.]

Mr. GOLDIN. Let me tell you. There is another part to the problem that I didn't deal with. And, in Cold War parlance, we used to measure our success by how many dollars go in, because it's easy.

You know, rich people keep track by how many dollars they have. That's how they keep score.

And, in the Federal Government, we would keep track, because we could measure input and not output.

I want to say it has been very healthy for the R&D community and the university community to have some budget cuts. It was a wake-up call, starting in 1992 when the NASA budget started coming down, that caused us to be more fruitful with our dollars expended.

And, until we wring out all the inefficiencies, I'm not prepared to say what the right percentage number is except to say we are getting very, very close to doing damage now. And, we have to think about some appropriate increases.

To go from 2.1 percent today and tomorrow have a budget that goes to 3 percent, I think would not be the right answer. But, it might want to go up a bit.

We ought to test and then go year-by-year, and maybe we ought to adjust it. But, I'm not for a 3 percent right away.

The CHAIRMAN. Dr. Krebs?

Dr. KREBS. It's—like Dr. Goldin, I have also been going around the country talking to my colleagues in the university and national laboratory and industrial community making the arguments for R&D, for research and development. I have the responsibility within the Department of Energy particularly to oversee the basic science programs within the department. That's about $2.5 billion.

But, the Department of Energy's total non-weapons, non-defense investment in R&D is about $6.4 billion. It is clear to me that the interaction between research—basic research/applied research—and development is not something that can be taken apart in a simplistic way.

And, in particular, because the Department of Energy in its basic science program supports more than 40 percent of physics research in this country alone, I talk a lot to physicists. And, I try to get them to realize that since they live in national laboratories or universities that, in fact, saving physics by itself is not going to make for a strong science and technology investment in this country.

And, as a consequence, it's important for chemistry, for engineering to be supported. And, that means, in particular, that you can't just look at one agency or another and expect its health, the health of its research funding, to basically take care of the health of our institutions or the health and productivity of science in the future.

Like Dr. Goldin, I've been involved both before I came to government in terms of being at a national laboratory but also now in the last three years in dealing with the consequences of requirements that have been placed upon research—perhaps good, perhaps bad—sometimes put on them by agencies like my own, sometimes established internally. And, that has increased the cost, perhaps unnecessary, of research and development in this country.

And, that is something that, within the Department of Energy, we have been attacking over the last several years. And, as a consequence, it's not clear to me that we are talking about major increases in the overall R&D budgets.

But, certainly the 2.1 percent is probably too low.

The CHAIRMAN. Dr. Lane?

Mr. LANE. Mr. Chairman, I will just make the point quickly that the President's policy on science, as it was laid out in Science in the National Interest, did suggest a number of 3 percent, not to be done immediately. Obviously, I agree with Mr. Goldin's comments there.

The second thing I would say is that we have every reason to believe that the more investment the nation is able to make in this area, the more payoff it will have for the American people. Economists of all political stripes have projected return on investment of the order of 30, even a higher percent on investment in R&D.

So, to the extent that the country can afford to make these investments, we know from experience that they are going to pay off for the American public.

The CHAIRMAN. Thank you very much. Mr. Ehlers.

Mr. EHLERS. Thank you, Mr. Chairman. First of all, let me commend you for scheduling these hearings.

I think this is an extremely important area of discussion. I am very concerned about the outyear figures on the budgets for scientific research and development in this country, particularly in the government sector. But, I think we have to worry about the private sector as well.

And, we are particularly concerned about the President's numbers which, as you know, are considerably worse than ours. And, ours are bad enough.

It's very important that we address this. And, I thank you for scheduling these hearings.

I should also mention, in regard to a comment I heard when I came in, as I was—I apologize for missing most of this hearing. I had several meetings I simply had to go to.

But, as I was hurrying here, I ran into a Member from the other side of the aisle who told me the atmosphere I would be entering in the room and apologized on behalf of another Member of the party that they represented. And, then I come in here and hear about witch-hunts.

And, it seems to me, Mr. Chairman, the Science Committee and the Science Committee room are the last place in the world to start looking for witches. Probably the only less likely place would be a church or a synagogue.

[Laughter.]

Mr. EHLERS. So, I—just on a rational basis, this is obviously the wrong place to expect a witch-hunt. And, I just wanted to get that comment on the record.

To more serious points. The question that was just addressed about the appropriate level for research—I had breakfast this morning with some of the leading scientists in the Administration, and all of us were bemoaning the fact of the budget numbers and deciding they had to be addressed, but the question was how.

You mentioned, Dr. Goldin, for example that corporate research tends to be very directed research with a payoff in a very short time. And, I think that's unfortunate.

I am very concerned about university research. I think it should be supported better. I think the federal labs should have better support.

But, one of the most dangerous trends, I think, is the decline, the relative decline, of research in the industrial and commercial sector. And, partly, I think, is the preoccupation with the bottom line, showing a profit at the end of each quarter.

And, there has to be some mechanism for us to address that. I think there are a number, but an immediate one that occurs would be a tax credit for industry, a somewhat better tax credit than they have now for their own research and development but also a separate tax credit for support they provide for university research, which I think might be a good way to get the private sector involved more directly with the university research effort in this nation but also pump additional funds into that process.

And, it could even be handled through either the NSF or some other foundation so we get the appropriate peer review, et cetera and make sure that good science is done. There are other mechanisms that have been proposed.

I would be interested in the comments of each of you as to how you think we can beef up our research efforts by mechanisms such as that.

I am very concerned that Japan out-spends us far more badly in the industrial sector in research and development efforts than they do in the governmental area. We do pretty well as a government compared to Japan and some of the other major industrialized countries in our support for science through the federal budget.

But, our research effort to industry and commerce, in general, is much poorer than Japan and some other countries. I would appreciate any comments any of you would like to offer on those issues, particularly how we could innovate our research effort by working cooperatively with the private sector.

Mr. GOLDIN. Let me say that I believe one of the things we can do with the high tech companies and the private sector—and I will talk for NASA specifically—is we are trying to transition NASA out of a condition where we did a lot of operational work in near term product development. We would repackage existing technology.

So, we have a major effort underway to transition NASA out of that activity and put it into the private sector. Instead of having cost type contracts in the R&D area with the private sector, we are trying to transition to cooperative agreements on dual use technologies.

NASA is driven by fundamental scientific questions. And, in answering those questions, we have to develop technology.

So, we are trying to transition NASA into the domain of the 10 to 20 year research rather than the zero to five year research. And, we are finding these cooperative agreements are returning some very, very good potential on long term results and incentivizing corporations to put their own resources into it.

That is a vehicle we are trying to undertake at NASA. And, we intend to do more and more of that.

Mr. EHLERS. Dr. Krebs, I know you have CRADAS. That relates to that.

But, do you have any other ideas at this time?

Dr. KREBS. Well, one of the things that we have been doing within the basic science programs beyond CRADAS because, in fact, although we have been very supportive of CRADAS because they enable us to support our laboratories in a cost-shared way with industry, we have found those programs, in fact, deeply reduced over the last couple of years. And, at least on this side of the Congress, the House Appropriations Committee, just zeroed our CRADAS money.

But, we are trying to be broader than that. We have a number of approaches to dealing with that from a basic research point of view.

First of all, we have programs such as the Advanced Synthesis and Processing program which funds both universities and national laboratories but only if there is an identified industrial partner. In other cases, we partner with our colleagues in our Energy Technology programs.

We have a program called Industries of the Future in our Energy Efficiency program where we are working with that program to identify opportunities for basic science that we can invest in in universities and national laboratories that has, by using the relationships with our colleagues in the Energy Efficiency program, and makes a faster hand-off, if you will, to the industrial participants in those programs. So, we are trying now and working with our colleagues, for example, in the Environmental Management program to make investments in basic science in a way that is guaranteed to be relevant to our colleagues in the Environmental Management program; and, thus again has an impact in the field and in the market earlier and quicker.

Mr. EHLERS. Dr. Lane?

Mr. LANE. Mr. Ehlers, we, at NSF, of course, focus most of our investment in research and education activities on university and college campuses. So, we strongly encourage interaction with industry, but we encourage that through partnerships with the universities.

And, we have a number of programs that do that. GOALI is a program that supports exchange of personnel, between industry and a university.

We have a number of center programs like the Engineering Research Centers, Science and Technology Centers, Supercomputer Centers, where we are forming—where we have a new program, in fact, established to carry on the excellence of that work.

And, finally, in all of those cases, industry is in as a genuine partner. And, of course, NSF doesn't choose which industry or how they would interact. We simply encourage that interaction with the university.

And, it's so valuable, as you rightly emphasized, to do that in the university environment, because education benefits from that activity. So, not only do you get the research knowledge and technologies flow to industry but you also get the educational, the rich educational, opportunities that come from that interaction.

I mention a new program that is called Transformation of Quality Organizations which, at NSF, is a multi-disciplinary program involving our engineering directorate and our social, behavioral, and economic sciences areas where we are working with industry to understand how companies have been able to transform themselves using concepts of quality—what works, what doesn't work—to support research activities, competitive, merit-reviewed research activities, in that area.

We stress the integration of research and education in everything we do. And, part of that education is to make sure that the students—undergraduates, graduates—on the campus know what career opportunities are there and that they can best understand that about industry by actually having industrial participation through the programs.

But, we strongly encourage more efforts of this kind. And, NSF, in its own planning, is looking toward expanding these kinds of activities and this link with industry, between industry and the universities, in the future.

Mr. EHLERS. Thank you. And, thank you, Mr. Chairman.

The CHAIRMAN. The Chair now wishes, in the time we have remaining with the three witnesses, to just kind of pull some of this together with you if I can for a moment.

First of all, the Chair appreciates very much the statement that all of you have made about the investment in R&D. And, I think that that's something that is shared on both sides of the aisle on this committee. And, I think in working with this committee, all of you know that.

The questions that we have here, though, get very serious with regard to this question of budgeting. For instance, with the exception of Dr. Krebs, both Dr. Lane and Mr. Goldin have their budgets under the same appropriations subcommittee and as does the EPA R&D.

Now, that exists under a 602[b] cap. That is reflected then in what the budget numbers may be in the years hence.

So, when we hear you say that you are going to go in and make your plea for more money for your agency on a year-by-year basis, we also know that within that same budget the Veterans Administrator has evidently been told that he's also going to be taken care of. And, one wonders then whether or not you can take every bit of this out of housing, because that's what you are down to under that 602[b].

And, I've got to say, as somebody who has to work with the real details of that, that begins to worry me, because I have sat on the Budget Committee and heard the arguments from the people on the housing side of things who are not willing to give up their piece of all this action, too. And, you know, I just question when you start setting budget priorities how you are going to get there from here.

And, I mean, that's part of the frustration. Just let me go to a couple of things, and then I am certainly going to give you some time to respond.

With regard to the Department of Energy, the fact is I think Mr. Olver raised a very important question here with regard to the defense side of that. The fact is that the biggest single cuts in the Department of Energy have not come from anything that we've cut in the civilian budget.

They have come as a result of the massive cuts in defense research. There has been about a $3 billion cut in defense research between 1993 and 1997.

And, that has a significant impact. It also has a significant impact on that overall 3 percent figure, because if you are taking it out of defense research, the fact is that has an impact on the overall amounts that we are spending on R&D in the country.

And, it would be fine if all that money were going back into civilian research. But, it's not.

It is simply being cut. And, we are losing it in the overall—the research program.

Mr. Goldin, I noticed, for example, that in your testimony you say the budget numbers are real. And, I assume that that does not include, though, the $11.6 billion figure that's in the year 2000, that from your testimony that is not a figure that you regard as real. You regard that as open to change.

And, here's the concern that I have. OMB has said that the priorities for your agency are Mission to Planet Earth, International Space Station, High Speed Research and Advanced Subsonics and Aeronautics, High Performance Computing and Communications, and New Millennium.

Our concern at this committee is nowhere on that list is Space Science. So, it says to us that if those numbers are real and these are your priorities, as defined by OMB, and that's where OMB is going to put the money in the future, what happens if the figure is $11.6 and that becomes a real figure?

Dr. Lane, participating in the budget process, again, we have been trying in terms of increasing basic research to hold NSF pretty much harmless. And, so, you know, you've made out better than most agencies.

But, let me tell you. At one point in the budget process, this dandy little item went up on the board called "indirect costs." And, we were going to cut—take $1 billion out of indirect costs.

Now, everybody knew that wasn't going to come out of scientists. That's just coming out of indirect costs.

But, guess what? It was going to be a $1 billion slash in the overall amount of money being made available to science.

And, that's the kind of thing that can happen out there that doesn't seem to have any science function whatsoever but can have a massive impact in the outyears. Now, we eventually took it off the table, because it became clear what the impact was.

But, it's coming back at some point. And, you know, we've pleaded with you and with others to give us some formula to address that issue as a part of all this so that we can manage it within the budget and have got nothing.

And, you know, we are going to have to deal with some of those kinds of issues. So, I just—my concern is here with the reality of this process, that if we go out and kind of cannibalize ourselves on a bipartisan basis—I mean, the Vice President, I know, is very committed to science and technology as a part of his agenda; but, on the other hand, he used some pretty pejorative language with regard to what we were doing last year as he toured around the country.

And, it didn't exactly set a very good atmosphere for discussing some of these things for real. But, there are real underlying issues here that are going to have to be dealt with if all of us are going to get done what we say we are going to do; and, that is, get the right kind of investment in R&D.

Mr. OLVER. Mr. Chairman——

The CHAIRMAN. Sure, Mr. Olver.

Mr. OLVER. Thank you, Mr. Chairman. I thank you for allowing me to comment on your summarization here.

There is no question that when we talk about 3 percent and whether we ought to go to 3 percent immediately, I mean, that's such an absurdity. Where we are at the moment, we would never make that kind of a jump nor, indeed, would it be done responsibly or could it be done responsibly.

But, the last time we were at 3 percent was about 1968. We got there, in large measure, because the portion of the matrix that was in defense expenditure was in the 1960s and then——

The CHAIRMAN. Well, in large part because of Apollo.

Mr. OLVER. (continuing) —it went down.

The CHAIRMAN. In large part because of Apollo. I mean, it was not only defense. It was——

Mr. OLVER. Okay.

The CHAIRMAN. The fact that we invested billions and billions of dollars in doing a crash program called "Apollo."

Mr. OLVER. Fine. And, then it dropped rather steadily and reached a low in the late 1970s. And, then the buildup that began was largely a—well, the buildup in the 80s was largely a defense-related one.

Apollo, yes. The space program in the 60s was probably a larger contributant perhaps than the defense establishment.

But, the—it hit 2.8 percent, roughly 2.8 percent, in the late 1980s, 1988 or 1989. And, it has been going down ever since, so that the wake-up call ought to have come, although much of that was probably a reduction in defense in the early 1990s in the whole matrix of what is going to R&D.

But, the wake-up call—you know, it's pretty precipitous to go down a tenth of a percent in our total percentage of GDP year by year by year. And, here we are now at 2.4.

I don't know. I wouldn't think that we need to get to 2.1 in order for a wake-up call to be given.

I am not sure what the wake-up call is supposed to be, because I think everybody sort of agrees we need a greater commitment than 2.1 in our overall commitment to R&D.

The one thing is that defense is a thing that is related to a real national security, real or perceived national security, need. And, it kind of goes up and goes down with that perception.

Whereas, there ought to be something somewhat more steady about what we are trying to do in the support of a healthy economy, a growth economy, a good commercial economy. There ought to be something steady there that military expenditure is a perturbation on.

Now, I have to think to think or suggest——

The CHAIRMAN. I was going to let the gentleman comment on mine, but I do hope we are not wandering far afield here so I can get the witnesses to comment on the statements I made.

Mr. OLVER. I am going to just comment on yours and then—because I seem to be the only Member from the other party here at the moment. I think that the Chairman—Mr. Chairman, with all due respect, you have posed what is basically a false choice.

You have pointed out that, yes, the VA wants more and that NSF wants more and that NASA wants more. And, DOE is in a different agency.

But, it isn't a choice of yes, for them to have more VA has to come down. The choice is equally who is setting the 602[b] allocation in the first place.

The President's allocations of 602[b] would not be in the same sort of a range.

The CHAIRMAN. Sure, they were.

Mr. OLVER. No. There would be less in defense expenditure.

We've just passed an appropriations bill through both branches that is $11 billion——

The CHAIRMAN. But, isn't that——

Mr. OLVER. (continuing) —more than he asked for.

The CHAIRMAN. That takes down the money for defense research. That's my point.

That comes out of R&D, too.

Mr. OLVER. And, the other part of it that governs the 602[b] allocation is the huge amount of money over the next few years that goes into tax cuts at the time when we have large deficits to try and get dealt with.

The CHAIRMAN. Including an R&D tax credit, a permanent R&D tax credit.

Mr. OLVER. Which is a very small portion of the sum total.

The CHAIRMAN. Well, no. We are trying——

Mr. OLVER. I mean, if you want your priorities on tax cuts to be things that allow for growth in jobs, then you place it on growth in jobs. And, you don't give tax cuts for a whole bunch of other things that don't have a relationship directly to the economy.

The CHAIRMAN. I understand. We have a real disagreement over the issue of tax cuts.

Mr. OLVER. But, you are placing the choice and one that I would claim is a false choice if you are claiming that it all has to fall on what NSF or NASA is going to take from housing.

The CHAIRMAN. Again, I would say to the gentleman, I would like to get the witnesses to respond to the concerns that I addressed, because I think in the reality of things those concerns are real and they do speak to the issue of the 602s, which would not be markedly different whether you took the President's budget or you took ours. They are going to be exactly the same choices.

And, I'm very concerned about exactly how that will come down and how we address it, how we address it for real without, as I say, cannibalizing the entire R&D establishment while we are doing it.

Mr. Goldin?

Mr. GOLDIN. First, let me start out by saying, by real, I accept the fact that that is the projected five year budget. It is not imaginary.

And, if it has been interpreted that I believe that that's the case, that's not the case. The $11.6 billion is right now in that budget.

What the President has said——

The CHAIRMAN. Well, let me ask you then, so the plans of NASA right now are based upon $11.6?

Mr. GOLDIN. Let me finish.

The CHAIRMAN. Okay. I'm sorry.

Mr. GOLDIN. What the President has said is these five year budget projections get impacted by a variety of other events. The thing that will not yield is the domestic discretionary spending cap. That is cast in concrete.

What will have flexibility is the ability to change accounts within that total discretionary domestic spending cap. That is the commitment.

And, we have been encouraged to work within that cap. Now, let me also say that the 602[b] account does not appear until after the budget resolution.

The President will give us the freedom to argue our case before the OMB on a year-to-year basis. This is part of his basic principle.

I accept that. I believe that's the right way to go. And, I am prepared to argue my case for NASA on a year-by-year basis.

Now, if the Congress in their infinite wisdom doesn't take a look at the total problem in the discretionary account—and I'm not confining this to Republicans; this is Democrats and Republicans—and wants to hide behind the 602[b] cap and then cause the R&D agencies to fight with each other over a meager pie, that's something that I think needs to be dealt with.

Let me also point out—and this is a message for Democrats and Republicans—I've been here since 1992. And, when the President proposes a budget, I hear this tremendous outpour of concern about R&D and about how the NASA budget is proposed too low.

But, let me give you the record of the Congress while we are talking about this. Fiscal 1992, we were cut $1.4 billion below the President's proposal; 1993, $693 million; 1994, $722 million; 1995, $304 million; 1996, $375 million.

So, this is a problem for all of us.

The CHAIRMAN. Sure.

Mr. GOLDIN. And, we have a tendency to get very intense about the issue. But, when we get down to it, we get trapped within the systems that we have.

So, I would say——

The CHAIRMAN. What do those figures relate to? Now, is that the entire R&D budget?

Mr. GOLDIN. No. This is the NASA budget.

The CHAIRMAN. Oh, this is the NASA budget?

Mr. GOLDIN. The NASA budget, that which I'm responsible for. And, these are in years where the President was criticized for cutting the budget.

So, the argument goes both ways. All I'm saying is that we, as a nation, we, as a government, have got to look at the total R&D account, as Mr. Olver has indicated.

And, we cannot allow these processes of the 602[b], 602[a] issues to cause DOD, NSF and NASA to fight with each other. And, I believe the President has the right approach.

The CHAIRMAN. I am not certain I wholly agree with that, because it seems to me that what we ought to be focusing on is how much is the total GDP we spend in science and technology, not just how much of the federal budget is spent in science and technology.

Mr. GOLDIN. By the way, I agree with that, too. And, then we ought to allocate the government and to industry.

Let me—I want to add another point that Dr. Ehlers brought up that I think is very important. And, I didn't answer your question adequately.

Research and development in this nation, in our accounting system, is treated as an expenditure, not as an investment. Go to any corporate account, go to any government account, and it's an expense.

This is the attitude in the nation. And, until we start looking at this as an investment, we are going to have a terrible problem.

I would want to add one other thing that I talked to the remote sensing industry with regards to our relationship with them, government relationship. I said that we intend to get efficiencies by transitioning to a commercial base use of overhead resources; and, with the money we save, we intend to turn some back into basic research at NASA, we intend to return some of that money back to balancing the budget because we are not going to hold on to all the savings.

And, then I said, in our relationship with the corporations, we think their track record is shameful with regards to the university system in this nation. Oh, they pointed out how they have a few research fellows and other things.

But, the fact of the matter is, corporate America—and we don't need the government to do it either. Corporate America better start picking up some of the load with the university system.

And, NASA, in our relationship with them, as we save money and as they get contracts, is going to demand when they have government money that they start spending some of that money in the universities. That's the other area that we think is necessary.

The CHAIRMAN. Dr. Krebs?

Dr. KREBS. The issue for the Department of Energy, if we want to talk about things from a congressional perspective—I mean, you have the problem with NASA and NSF perhaps of having a tradeoff between them and housing and Veterans programs within a single appropriations subcommittee. The Department of Energy is complicated, because we draw funding from at least three different budget functions and we have to negotiate this between two different appropriations committees.

And, I think the history is that the Secretary has made commitments and has been under constraints within the Administration to meet funding reductions, significant ones, over the last three years. And, I would just like to remind you again that we've reduced our budget since 1993 from over $19 billion to $16.3 billion.

However, in doing that, we must make tradeoffs. And, I also want to say that within that budget, we found ways to increase our R&D expenditures.

I believe—and I would like to submit for the record—that over the last two years funding for defense-related, the weapons-related, research and development within the department has, in fact, increased, particularly in the last two years. But, so has funding for the R&D in both basic and applied research and development.

And, I would like to submit that for the record, because I don't have that in my own head or in my own records, since I only have responsibility directly for the basic science programs.

So, within the tradeoffs that the Secretary has had to make and the discussions with the Administration subsequently, we have managed to do that. However, the problem is presented to Congress that some of the offsets come out of one appropriations committee's area of responsibility and the increases may be in another.

And, I think that the problem there, then, is that the department gets accused of playing games. But, in fact, it means that the system is not able to allow for these kinds of tradeoffs.

And, it is—we will acknowledge our problems in this. But, I think there is also a problem in the Congress as to these kinds of complexities.

[The following information was received for the record:]

CHART SHOWING INCREASED DEFENSE R&D OVER LAST 2 YEARS

DEPARTMENT OF ENERGY
Total Research and Development Funding
B/A in Millions

	As Spent Dollars		
	FY 1995	FY 1996	FY 1997 Request
Defense R&D	$2,558.8	$2,682.8	$2,760.5
Civilian R&D	3,957.6	3,537.9	3,632.0
Total DOE R&D	$6,516.4	$6,220.7	$6,392.5

The CHAIRMAN. Dr. Lane?

Mr. LANE. Mr. Chairman, this nation is feeling the benefits of the investment in science and technology over a number of years, past investments that sometimes take a while to blossom into the benefits that the people, in fact, experience. I am very concerned that if we look at the combination of government and private support for R&D that we are talking about running an experiment in this country we have never done before to see whether we can cut that investment in what is the very foundation of progress in this country and has been for so many years.

Can we really cut that investment by 20 percent, 25 percent, 30 percent, whatever number you would like to choose, and remain a nation of leadership in the 21st Century?

Nobody has got an algorithm for that. Nobody knows for sure what the answer to that question is.

But, I think it's a very high risk experiment. And, in order to get out of that, given all the constraints that we have talked about, it's going to take an almost unprecedented resolve on our part and an almost unprecedented degree of cooperation between the public and private sector to make this happen.

I don't see any other way that we are going to come out of this with the kind of investment that we are going to need to keep this nation strong. It's a great concern to me.

We've talked about it in earlier hearings. And, I completely agree with my colleagues on the gravity of this situation.

I don't know the answer. But, I think it is an issue for grave concern.

The CHAIRMAN. Well, I thank you for that. And, I guess part of the question here is one of whether or not, as a part of that allocation of resources, that we also look at the reforms necessary to make the allocation of resources real.

I mean, the fact is that every entrepreneurial high-tech firm that is deeply engaged in research that I've talked to—and I've talked to an awful lot of them—tell me that high on their list of priorities to make the kinds of investments we all want made is a capital gains tax cut. Now, you know, that is a reallocation of priorities, but it's very important for these firms that are, in fact, making the investments in the technology of the future.

Now, I mean, that becomes controversial on Capitol Hill. And, it's not within the jurisdiction of this committee.

But, it's an important ingredient in what moves ahead. And, I think, to some extent, the Administration accepts that at the present time.

They have said that this would be a useful thing to do. So, you know, it's a series of very difficult decisions that we have to make within this whole area of budgeting.

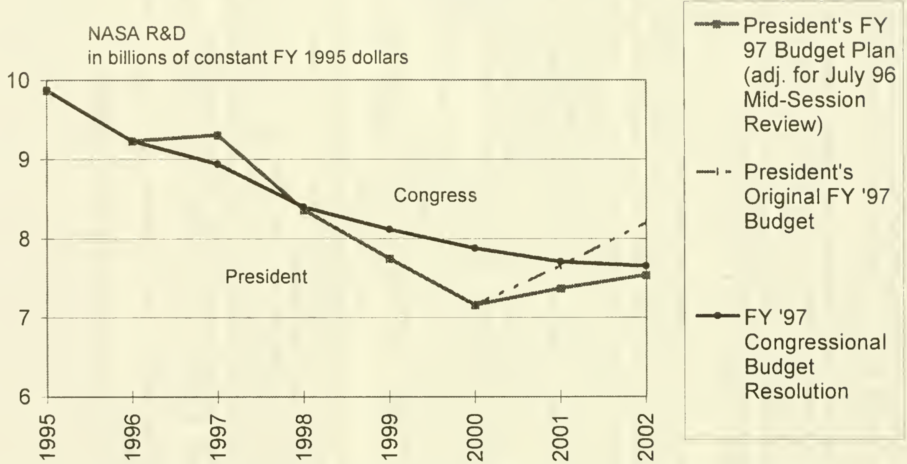
And, you know, I appreciate the fact that all of you have come before us today and helped us to sort it out. That was my intent here, to help sort out the process and get us to the point where we are all discussing things from a little bit better perspective.

And, with that, I thank you for coming. The hearing stands adjourned.

[Whereupon, the hearing was adjourned at 1:00 p.m., Wednesday, July 24, 1996.]

[The following material was received for the record:]

Chart 2. Projected Federal Spending on NASA R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

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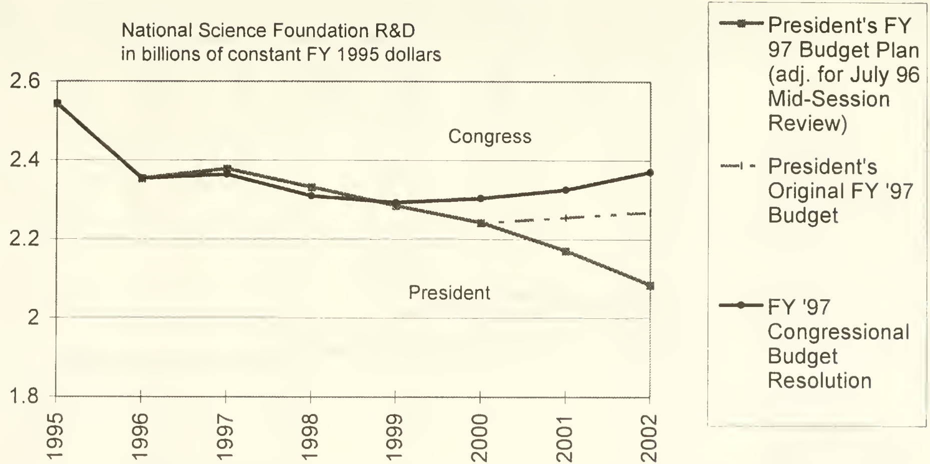
AAAS - July 19, 1996

Chart 3. Projected Federal Spending on NSF R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

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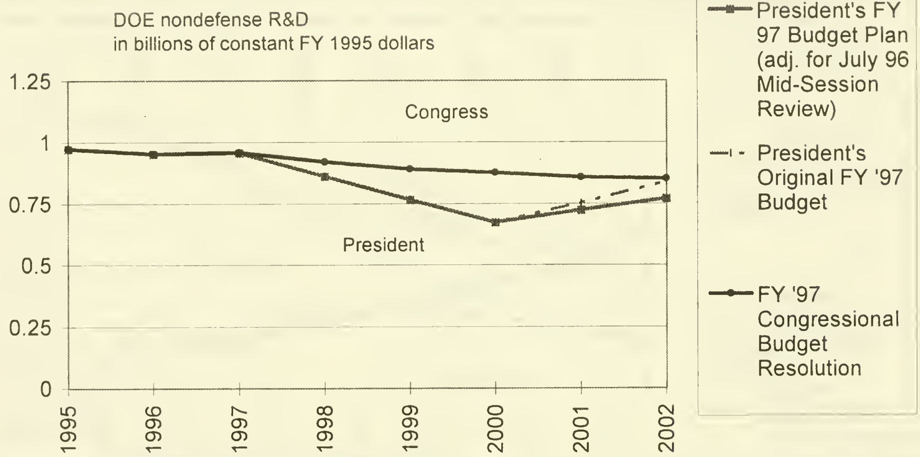
Chart 4A. Projected Federal Spending on DOE General Science R&D, FY 1995-2002



Based on AAAS analyses of the outyear projections in the President's FY 1997 budget (adjusted July '96 based on OMB's Mid-Session Review) and FY 1997 concurrent (final) budget resolution.

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NATIONAL
SPACE SOCIETY

OUT-YEAR BUDGETS FOR NASA PUNITIVE

Testimony submitted for the record by David Brandt
Acting Executive Director, National Space Society
For the Committee on Science
U.S. House of Representatives
July 24, 1996

Just as NASA is getting back on its feet with a renewed spirit of achievement, Congress and the Administration propose a series of out-year budgets that will savage the agency. The deep cuts in spending will force the cancellation of major programs, create turmoil in the agency, and signal to other government departments that if reforms are adopted to reduce waste and improve performance, the reward will be debilitating cutbacks in funding.

The out-year budgets signal a retreat for America's space program. Ongoing programs will suffer and planned missions will be shelved. The rollback in spending threatens to disrupt the agency's balance of programs and derail a new era of discovery in planetary exploration. Rather than proudly lead America into the new millennium, NASA will be preoccupied with keeping programs afloat and licking its wounds.

The Administration proposes to fund NASA in FY 1997 at $13.8 billion -- a $400 million reduction form this year's budget level (real terms). Congress is seeking a $500-$600 million cutback in spending. When negotiations are complete for FY 1997, the space agency's budget will have been reduced six years in a row, or more than 15 percent since 1992 when spending peaked

Proposed cuts from FY 1998 to FY 2000 are twice as deep as in recent years. The Administration would reduce NASA's expenditures from $13.8 billion to $10.7 billion -- a $3.1 billion or 23-percent rollback in funding (real terms). Congress, during this time, would reduce the space agency's budget to $11.3 billion in FY 2000 -- a $2 5 billion or 18-percent reduction in funding (real terms).

The space agency has been able to absorb cuts in funding by implementing cost-saving measures. NASA testified earlier this year that it could manage the Administration's proposed FY 1997 cutback without causing turmoil. But the out-year budgets are too severe and the space agency will have no choice but to terminate science and technology programs.

NASA's NEW VISION

NASA has come a long way since 1992, when Daniel S. Goldin, a former TRW executive was appointed administrator. The past five years he has re-engineered the agency from top to bottom to improve the way it does business. One of the most

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sweeping changes includes the introduction of a new vision for the agency. In years past, the driving force behind the space program largely was political, to beat the Soviet Union to the Moon and first to explore our solar system. But after the space race was won, NASA began to flounder without a clear view of its purpose or direction.

The space agency's new vision states simply, yet profoundly, that "NASA is an investment in America's future." Its mission is to explore, discover, and innovate; to advance scientific knowledge and keep America competitive. The space agency seeks to "be at the forefront of exploration and science," to "develop and transfer cutting-edge technologies," and to "establish a permanent human presence in space." NASA explicitly states the long-term goal to return to the Moon and human missions to Mars.

The new vision for NASA responds to the growing competition around the world for advanced technology, which fuels rapid economic growth. In the 1970s, the United States was the world's leader in high-technology exports. At that time, Japan expanded its rate of investment in science and engineering, and in the early 1980s eclipsed America as the top exporter of high-tech goods. Today, other countries are following Japan's model and are investing heavily to create technology-based economies, intensifying world competition. Japan recently announced plans to double its spending in R&D by the turn of the century. For America to maintain its position in advanced technology, it must substantially invest in science and engineering, which means adequately funding NASA.

The space agency works in partnership with industry and universities to generate scientific knowledge, provide educational opportunities to students, and develop advanced technology. For instance, in space science, under NASA's new vision, probes are shrinking in size and cost, while capabilities are improving. Spacecraft must be reliable, low-weight, and operate autonomously for long durations. Only limited power is available in deep space and vehicles must survive extreme temperatures and high levels of radiation. During launch, spacecraft experience severe vibrations and g-forces. Overcoming these many obstacles forces engineers to seek solutions they would not necessarily confront on Earth. The new technologies that are produced spill into the marketplace, creating high-paying jobs. The innovations allow NASA to reduce costs and expand opportunities to explore the heavens.

Each of NASA's research facilities are being streamlined and shaped into centers of excellence. They are being focused to achieve specific technological and scientific goals. Bureaucracy is being cut at every level. In 1992, NASA's work force totaled 25,400 employees. By 1999, the agency will have just 17,000 employees -- a 33 percent reduction.

FIXING THE SPACE STATION

For years the space station suffered from poor management, causing delays, cost overruns, and repeated design changes mandated by Congress. NASA has reorganized the program's management structure and incorporated Russia as a full partner into the international project. The final engineering design is locked into place, with the station's budget capped at 2.1 billion annually. Tens of thousands of pounds of hardware have been constructed, with the first component slated for launch in late 1997.

The space station will allow scientists to conduct research to develop countermeasures to the harmful affects experienced by humans when they travel to space for long periods of time. On the orbiting laboratory, scientists also will pursue fundamental and applied research in biotechnology, combustion, materials science, and microgravity physics. According to the National Research Council, there is a "scientific need to understand better the role of gravity in many physical, chemical, and biological systems." In space, gravity becomes a parameter the same as temperature or dosage, which allows scientists to uniquely explore physical processes and identify new phenomena not possible on Earth.

Since 1985, NASA has worked closely with private industry and universities to explore how the microgravity environment of space can be exploited to enhance commercial products and manufacturing. Progress has been slow due to infrequent access to space and the need to first build hardware to conduct experiments. Space equipment must meet stringent safety standards and faces limitations in size, weight, and energy. But momentum is growing as businesses learn how to take advantage of microgravity and the ultra-vacuum environment of space. From 1994 to 1996, industry doubled its investment in space research and manufacturing to $40 million. There are now 150 companies and 70 universities involved in the commercialization of space.

Some commercial activities are progressing rapidly, such as growing protein crystals, which are used to determine the three-dimensional, molecular structure of a protein. With this information, pharmaceutical companies can design vaccines and drugs to treat illnesses. Other promising commercial activities have yet to be validated by space experiments. One of the first manufactured goods from orbit may be a polymer (plastic) to make contact lenses that are superior to what is possible terrestrially. Several space experiments have proven successful and the company spearheading the research plans to seek FDA approval for the process.

Only since the early 1990s has space research begun to generate high-quality data from experiments. Not until the space station is constructed will scientists and industry have predictable, frequent access to space, which will accelerate the development of space commerce. When the station opens for business, NASA will not have to lug hardware for research to and from space, only samples for testing and finished products. Scientists will remain in orbit full-time to conduct experiments, accomplishing in days or weeks what now can take years.

NEXT-GENERATION ROCKETPLANE

One of the most important, new initiatives at NASA is the Reusable Launch Vehicle (RLV) program. It was initiated in 1994 to develop and validate new technology to build a completely reusable rocket vehicle. A final design has been selected for a half-scale prototype, which now is being built and will be ready for testing in 1999. The vehicle, unlike the Space Shuttle, is engineered for easy maintenance and operation. When the program is complete, NASA hopes private industry will be able to finance, build, and operate a full scale RLV. With the new vehicle, NASA and industry predict the cost to travel to space could be reduced by as much as $10,000 a pound to $1,000.

BRUISING CUTBACKS

Throughout NASA, programs have been reformed and re-focused. The space agency again is aggressively pushing the boundaries of space and innovating new technologies. A can-do spirit, reminiscent of the 1960's has returned to the agency. The rebirth of NASA is an outstanding achievement that all Americans Can be proud.

Despite its many accomplishment since 1992, the space agency is not resting on its laurels. Much work remains to be done. What is important to understand is that NASA has been infused with a new culture and vision. Operating faster, cheaper, and better is an ongoing process to constantly enhance performance.

NASA's reforms are even more remarkable when considering that, throughout the process of retooling itself, the space agency's budget has been cut every year. By operating more efficiently, NASA has been able to meet lower spending targets and avoid canceling programs. It has demonstrated in spades the efficacy of its new policies. But just when the space agency has regained its health, the Administration and Congress propose to double the size of future budget cuts and undo much of the good work accomplished to date.

NASA's reward for doing a job well done is a three-year budget rollback that will cripple the agency's operations. NASA cannot survive the Administration's 7.7 percent cut in FY 1998, an 8.3 percent cut in FY 1999, and an 8.7 percent cut in FY 2000 without terminating major programs. Nor can it survive the Congressional cutbacks that are nearly as severe. While much fat has been taken out of NASA, it cannot hope to find additional huge savings to make up for future budget shortfalls.

No other federal agency has so revolutionized how its operates, finding ways to constantly save money and improve performance. NASA has stepped up to the plate to give Americans increased value for their tax dollars. Many other federal departments, in contrast, continue profligate spending practices. For these agencies, it is business as usual, with bureaucrats fighting cuts to the last breath.

NASA, on the other hand, has not sought to play politics to safeguard its future. It has been a team player and agreed to cut spending to help balance the federal budget. The space agency now is in the unenviable position of having done what's right, only to face a series of budget reductions that undermine its ability to manage a balanced program.

Members of the National Space Society, in the strongest terms possible, object to the harsh, out-year budget reductions proposed by the Administration and Congress. NSS members believe it is wrong to slash NASA's funding when the agency is doing everything possible to achieve savings and enact reforms to improve operations.

During the 1960's, NASA responded to America's call to land a human on the lunar surface by the end of the decade. Now there is a new challenge that threatens our nation's well-being, and the space agency again has responded. It has implemented a new vision to safeguard America's economic health and security. The battleground involves the global marketplace for advanced technology. Competition is intensifying. More than ever, the U.S. must commit sufficient resources to science and engineering to ensure our future prosperity.

The National Space Society urges members of Congress and the Administration to stabilize NASA's budget. The space agency is an essential component of our nation's R &D investment. NASA is asking only for an opportunity to remain whole and pursue its vital missions. America deserves a dynamic space program and NASA deserves an adequate level of funding.

FUTURE NASA BUDGETS DISASTROUS

Dr. Louis Friedman
Executive Director, The Planetary Society
Statement to the Committee on Science
U.S. House of Representatives
July 24, 1996

The future budgets proposed for NASA by the Administration and Congress are a death warrant for components of America's space program. If implemented, major science and exploration projects will have to be terminated, as well as research centers possibly closed. America could lose its leadership in space. Our nation's investment in science and engineering, already in decline, will be further diminished, weakening our economic competitiveness.

Every year since 1992, NASA's budget has been cut. The space agency now operates on 12-percent less funding than five years ago (real terms*). The Administration is seeking to lop another $400 million from NASA in the FY 1997 budget (real terms). The House has voted to cut $600 million in next year's funding (real terms).

So far, NASA has been able to absorb these budget cutbacks without cancelling programs. Much credit for this achievement is due to the reforms introduced by Administrator Daniel S. Goldin, who was appointed to the agency in April of 1992. He has implemented modern management methods, cut bureaucracy, and created a new vision for the space agency.

Under Goldin's tenure, cost overruns have become a thing of the past. NASA's research centers are being streamlined, programs privatized, and waste and duplication eliminated. The space agency is promoting advanced technology to lower costs, while at the same time increasing performance. More than 22,000 civil service and contractor jobs have been eliminated, with more to come.

Today, despite the sustained funding reductions, NASA is accomplishing more with less. Discoveries from Earth to the edge of the universe are announced nearly every week. The agency has retooled itself and again is operating as a premier, high-technology organization. NASA is reshaping how it does business, replacing the traditional government-contractor relationship with innovative partnerships. Working shoulder-to-shoulder with industry encourages innovation and flexibility, and will allow America to leap-frog global competition and generate future economic opportunities.

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* Adjusted for inflation.

Investing in NASA, in addition to spurring technology, helps strengthen our nation's educational system. Space exploration inspires our youth to excel in math and science. In universities throughout America, educators, scientists, engineers, and students are collaborating to explore the space frontier, advancing our knowledge of the universe, of Earth, and of life itself.

NASA funds provide scientists and engineers with opportunities to push the boundaries of knowledge. Students gain real-life experience in developing advanced technology, which they bring to the private sector, fueling our nation's competitiveness. And faculty develop unique expertise in science and engineering, which upgrades the level of education available to students, keeping our university system the very best in the world.

THE OUT-YEAR BUDGET SQUEEZE

NASA has adopted sweeping reforms to save money and bridge cutbacks in its budgets. The cost-saving measures have allowed the space agency to avoid the cancellation of major programs. But after FY 1997, it no longer will be able to absorb the deep reductions in spending proposed by the Administration and Congress. The agency will have no alternative but to begin cutting muscle and bone.

The White House budget reduces funding for NASA from $13.8 billion in FY 1997 to $10.7 billion in FY 2000 -- a $3.1 billion reduction (real terms). Congress, in the same period, is on record seeking a $2.5 billion rollback in spending, from $13.8 billion to $11.3 billion (real terms).

NASA cannot hope to meet the lower funding targets without cancelling programs and/or closing research centers. The proposed out-year budget reductions are twice as deep as the cuts made in recent years. From FY 1998 to FY 2000 (three years), NASA faces a 18-23 percent drop in its budget, compared to about 15 percent from FY 1992 to FY 1997 (six years).

Both the Administration and Congressional out-year budgets will devastate America's space program and end our leadership in space as we now know it. In FY 1998, the Administration and Congress seek to chop about $1 billion (real terms) from NASA. To understand the severity of this reduction, consider that the space agency could eliminate the entire Aeronautical Research and Technology Program and still would need to find an additional $150 million in savings. Terminating the Life and Microgravity Sciences and Applications program saves only $498 million. Cutting all funds to academic programs reduces NASA's budget by only $101 million. Axing the Space Access and Technology program saves about $725 million.

NASA maintains a dozen research and space facilities nationwide, which are intellectual as well as employment centers in their communities. The operation of the facilities consumes about 15 percent of NASA's annual budget. The rest of the funding is distributed via contracts to businesses, educational institutions, non-profit organizations, and other government agencies for goods and services. For instance, of the total budget for the Kennedy Space Center, about $1.23 billion annually, only a small portion is used for basic operations and government personnel. Most of the money goes to private companies to provide services for the space shuttle fleet. Non-governmental workers maintain the four orbiters, rebuilding engines and replacing parts. They assemble the solid rocket boosters, main fuel tank, and orbiter, and are instrumental in managing launch operations.

Each of the centers has unique research facilities. Langley Research Center has numerous wind tunnels to conduct research and test design models. The Lewis Research Center in Ohio investigates aircraft and space propulsion, space power systems, and satellite communications. The center's 140 buildings are located at the Cleveland airport and include a Space Experiments Lab, Zero-Gravity Drop Tower, Icing Research Tunnel, space tanks, chemical rocket thrust stands and chambers for testing jet engines.

All told, NASA has invested $15 billion in infrastructure (current replacement cost). Turning the lights off at various research and space centers would be a terrible waste of resources and is not a panacea to solve the space agency's budgetary dilemma.

Realistically, to find billions of dollars annually in savings, NASA would have to amputate scientific and technological programs and possibly affiliated centers -- a disastrous course of action. To save $3 billion annually, as required by the Administration's FY 2000 budget, NASA, for instance, would have to cancel the entire Mission to Planet Earth program, kill the space station, or completely wipe out the space science exploration program.

It has taken years -- and in some cases decades -- for the space agency to develop scientific and technological skills for programs at its research centers. The pool of talent cannot be readily dismissed and reconstructed at some later date when budgetary pressures might be less severe. NASA has carefully created a balanced program that includes human space flight, planetary science, Earth science, and aeronautics. Cut the heart out of any major program and all of NASA will suffer.

If the Administration and Congress -- in their zeal to balance the federal budget by 2002 -- move ahead and implement NASA's out-year budgets, it will mean the end of an era in space exploration. The hard work to institute new reforms the past five years will be for naught. What could have been a glorious new beginning for NASA, as we approach the new millennium, will instead be a catastrophic failure of vision and hope for a better tomorrow. And the message broadcast to other federal departments will be unmistakable; don't implement spending reforms because the reward for doing so is deeper, ruinous cuts in funding.

PLANETARY EXPLORATION

Space science often is termed the jewel of NASA. The program uniquely has opened our eyes to the universe. In our lifetime, spacecraft have ventured to all the planets but Pluto. We have identified 61 moons, as well as some 5,000 asteroids. Landers have touched down on the surfaces of the Moon, Mars, and Venus. Most recently, the Galileo probe plunged through the clouds of Jupiter, examining the gaseous giant's atmosphere.

Despite the years of exploration, scientists have assembled only a basic mosaic of our solar system. Much remains to be discovered. Most significant, we do not know whether life ever existed elsewhere than Earth -- in our solar system or beyond.

Under the new-NASA, planetary programs have been modernized and revitalized. The agency no longer designs billion-dollar robotic spacecraft. Instead, probes are smaller, cheaper, and better. The first of the new-generation spacecraft, called the Near Earth Asteroid Rendezvous (NEAR), was launched in February of 1996. The probe will collect data on the asteroid, Eros, which has been largely unaltered over billions of years and thus offers scientists the best source of information to learn about the early formation of our solar system. The price tag for the small exploratory mission totals $122 million and was readied for launch in just three years.

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Later in 1996, NASA will send two spacecraft to Mars, initiating a decade-long investigation of the red planet to understand its climate, geology, geochemistry, origin, and evolution. In 1997, the Cassini spacecraft will be launched to investigate Saturn, and the Lunar Prospector to gather data on the Moon's composition and resources for possible future applications. By comparison, NASA launched only two major planetary missions during the 1980's.

The resurgence in planetary exploration promises to create a new dawn of discovery. There is a renewed sense of vitality and excitement. For one more year, NASA has funding to operate with a full complement of programs. But after FY 1997, the operations of the space science program are in doubt. If the space agency is forced to cut billions from its budget, funding will be unavailable for ongoing scientific programs and new starts. NASA's bold agenda to explore Mars will be endangered, as well as New Millennium Program, which involves industry and university partnerships to develop advanced technology for new spacecraft.

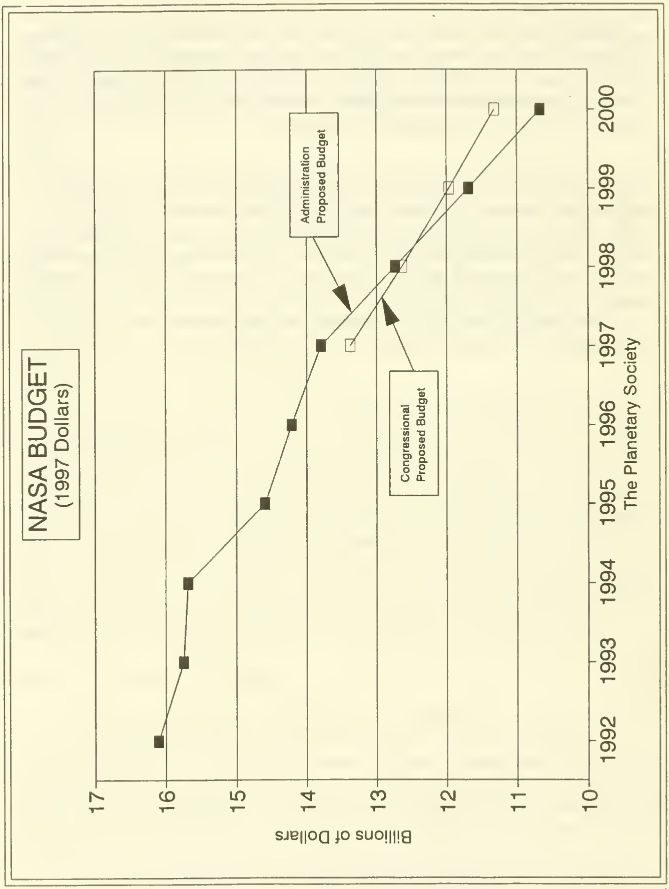
Space science already has suffered deep cuts in spending. In FY 1997, the Administration is seeking to reduce the program's budget to $1.86 billion -- a $175 million reduction from this year's funding level. Unlike other programs at NASA, space science to survive must be infused regularly with new missions. NASA hopes to launch low-cost spacecraft every year to explore our solar system. But this bold vision is threatened by the cutbacks now planned in the out-year budgets for NASA. Also questionable is funding to extend the Galileo mission to further explore the giant planet and its system of Jovian moons, and money to mount an ambitious, low-cost mission to Pluto, the last unexplored planet in our solar system. NASA's proposed Origins Program to search for other habitable planets also will not likely see the light of day.

NASA'S TENUOUS FUTURE

Americans do not want to see their space program become moribund because of myopic budget cuts. As a nation, we take pride in NASA's accomplishments. The recent exploration of Jupiter's atmosphere by the Galileo spacecraft received immense national attention and praise. Planetary missions stir our imagination. We share in the exhilaration of discovery. The adventures draw us together and opens our eyes to the worlds beyond Earth.

Humans long have pondered the origins of the planets and life itself. With robotic probes we have been able to learn more about our solar system than in all previous history. The journey into space has finally evolved to the point where scientists can begin to answer how our solar system originated and life evolved on Earth. Many people believe the achievement for which our generation may be longest remembered will be our exploration of other worlds. It will be this contribution to civilization that will survive for centuries, not unlike the Copernican revolution of an earlier era.

But this vision for America and NASA is jeopardized by the budget cuts proposed in the out-years. On behalf of The Planetary Society -- the world's largest space interest group with more than 100,000 members -- I urge Congress and the Administration to forgo the drastic reductions in NASA's budget and to stabilize funding for the agency. NASA already has contributed mightily to balancing the federal budget, and will continue to seek cheaper and better ways of doing business. But the space agency should not be compelled to do more than its fair share and sever major programs that undermine its operations and America's leadership in space exploration.



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